









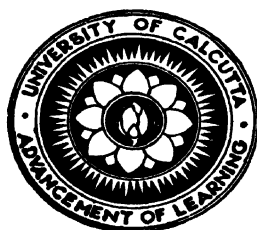
## **REGULATIONS**



**UNIVERSITY OF CALCUTTA**

# **REGULATIONS**

**With Amendments up to  
30th June, 1945**



**UNIVERSITY OF CALCUTTA  
1945**

***Rs. 4/-***

PRINTED IN INDIA

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**ACT OF INCORPORATION  
AND  
OTHER ACTS**



# ACT OF INCORPORATION

ACT NO. II OF 1857

Passed on the 24th January, 1857

*An Act to establish and incorporate an University at Calcutta*

WHEREAS, for the better encouragement of Her Majesty's subjects of all classes and denominations within the Presidency of Fort William in Bengal and other parts of India in the pursuit of a regular and liberal course of education, it has been determined to establish an University at Calcutta for the purpose of ascertaining, by means of examination, the persons who have acquired proficiency in different branches of Literature, Science, and Art, and of rewarding them by Academical Degrees as evidence of their respective attainments, and marks of honor proportioned thereunto; and whereas, for effectuating the purposes aforesaid, it is expedient that such University should be incorporated: It is enacted as follows (that is to say):—

**Incorporation.** I. The following persons, namely,

The Right Honorable CHARLES JOHN VISCOUNT CANNING,  
Governor-General of India.

The Honorable JOHN RUSSELL COLVIN,  
Lieutenant-Governor of the North-Western Provinces.

The Honorable FREDERICK JAMES HALLIDAY,  
Lieutenant-Governor of Bengal.

The Honorable SIR JAMES WILLIAM COLVILLE, Knight,  
Chief Justice of the Supreme Court of Judicature in Bengal.

The Right Reverend DANIEL WILSON, Doctor of Divinity,  
Bishop of Calcutta.

The Honorable GEORGE ANSON, General,  
Commander-in-Chief of the Forces in India.

The Honorable JOSEPH ALEXANDER DORIN,  
Member of the Supreme Council of India.

The Honorable JOHN LOW, Major-General,  
Companion of the Most Honorable Order of the Bath,  
Member of the Supreme Council of India.

The Honorable JOHN PETER GRANT,  
Member of the Supreme Council of India.

The Honorable BARNES PEACOCK,  
Member of the Supreme Council of India.

CHARLES ALLEN, Esquire,  
Member of the Legislative Council of India.

HENRY RICKETTS, Esquire,  
Provisional Member of the Supreme Council of India.

CHARLES BINNY TREVOR, Esquire,  
Judge of the Sudder Court in Bengal.

Prince GHOLAM MUHAMMUD.  
WILLIAM RITCHIE, Esquire, Advocate-General in Bengal.

CECIL BEADON, Esquire,  
Secretary to the Government of India.  
Colonel HENRY GOODWYN of the Bengal Engineers.  
Chief Engineer in Bengal.

WILLIAM GORDON YOUNG, Esquire,  
Director of Public Instruction in Bengal.  
Lieutenant-Colonel WILLIAM ERSKINE BAKER,  
of the Bengal Engineers,  
Secretary to the Government of India.

Lieutenant-Colonel ANDREW SCOTT WAUGH,  
of the Bengal Engineers, Surveyor-General of India.

KENNETH MACKINNON, Esquire, Doctor in Medicine.

HODGSON PRATT, Esquire,  
Inspector of Schools in Bengal.

HENRY WALKER, Esquire,  
Professor of Anatomy and Physiology in the Medical  
College of Bengal.

THOMAS THOMSON, Esquire, Doctor in Medicine,  
Superintendent of the Botanical Garden at Calcutta.

FREDERICK JOHN MOUAT, Esquire, Doctor in Medicine,  
and Fellow of the Royal College of Surgeons.

Lieutenant WILLIAM NASSAU LEES of the Bengal Infantry.

The Reverend WILLIAM KAY, Doctor of Divinity,  
Principal of Bishop's College.

The Reverend ALEXANDER DUFF, Doctor of Divinity.

THOMAS OLDHAM, Esquire,  
Superintendent of the Geological Survey of India.

HENRY WOODROW, Esquire,  
Inspector of Schools in Bengal.

LEONIDAS CLINT, Esquire,  
Principal of the Presidency College.

PROSONNO COOMAR TAGORE,  
Clerk Assistant of the Legislative Council of India.

RAMAPERSHAD RAY,  
Government Pleader in the Sudder Court of Bengal.

The Reverend JAMES OGILVIE, Master of Arts.

The Reverend JOSEPH MULLENS, Bachelor of Arts.

Moulavy MUHAMMUD WUJEEH,  
Principal of the Calcutta Mudrasah.

ISHWAR CHUNDR A BIDYASAGUR,  
Principal of the Sanskrit College of Calcutta.

RAMGOPAUL GHOSE,  
Formerly Member of the Council of Education.

ALEXANDER GRANT, Esquire,  
Apothecary to the East India Company.

HENRY STEWART REID, Esquire,  
Director of Public Instruction in the North-Western Provinces,

being the first Chancellor, Vice-Chancellor, and Fellows of the said University, and all the persons who may hereafter become or be appointed to be Chancellor, Vice-Chancellor, or Fellows as hereinafter mentioned, so long as they shall continue to be such Chancellor, Vice-Chancellor, or Fellows, are hereby constituted and declared to be one Body Politic and Corporate by the name of the University of Calcutta; and such Body Politic shall by such name have perpetual succession, and shall have a common seal, and by such name shall sue and be sued, implead and be impleaded, and answer and be answered unto, in every Court of Justice within the territories in the possession and under the Government of the East India Company.

II. The said Body Corporate shall be able and capable in law to take, purchase, and hold any property, movable or immovable, which may become vested in it Power to hold and dispose of property. for the purposes of the said University by virtue of any purchase, grant, testamentary disposition, or otherwise; and shall be able and capable in law to grant, demise, alien, or otherwise dispose of, all or any of the property, movable or immovable, belonging to the said University; and also to do all other matters incidental or appertaining to a Body Corporate.

III. The said Body Corporate shall consist of one Chancellor, one Vice-Chancellor, and such number of ex-officio and other Fellows as the Governor-General of India in Council hath already appointed, or shall from time to time, by any order published in the *Calcutta Gazette*, hereafter appoint; and the Chancellor, Vice-Chancellor, and Fellows for the time being shall constitute the Senate of the said University: Provided that if any person being Chancellor, Vice-Chancellor, or Fellow of the said University, shall leave India without the intention of returning thereto, his office shall thereupon become vacant.

IV. The Governor-General of India for the time being shall be the Chancellor of the said University, and the first Chancellor shall be the Right Honorable Charles John Viscount Canning.

V. The first Vice-Chancellor of the said University shall be Sir James William Colville, Knight. The office of Vice-Chancellor shall be held for two years only; and the Vice-Chancellor hereinbefore nominated shall go out of office on the first day of January, 1859. Whenever a vacancy shall occur in the office of Vice-Chancellor of the said University by death, resignation, departure from India, effluxion of time, or otherwise, the Governor-General of India in Council shall, by notification in the *Calcutta Gazette*, nominate a fit and proper person, being one of the Fellows of the said University, to be Vice-Chancellor in the room of the person occasioning such vacancy: Provided that on any vacancy in the said office which shall occur by effluxion of time, the Governor-General of India in Council shall have power to re-appoint the Vice-Chancellor hereinbefore nominated or any future Vice-Chancellor to such office.

VI. The Lieutenant-Governors of Bengal and the North-Western Provinces, the Chief Justice of the Supreme Court of Judicature at Fort William in Bengal or of any Court of Judicature hereafter to be constituted to or in which the powers of the said Supreme Court may be transferred or vested, the Bishop of Calcutta and the Members of the Supreme Council of India, all for the time being, shall be ex-officio Fellows of the said University. The whole number of the Fellows of the said University, exclusive of the Chancellor and Vice-Chancellor for the time being, shall never be less than thirty; and whenever the number of the said Fellows, exclusive as aforesaid, shall by death, resignation, departure from India, or otherwise, be reduced below thirty, the Governor-General of India in Council shall forthwith, by notification in the *Calcutta Gazette*, nominate so many fit

and proper persons to be Fellows of the said University as, with the then Fellows of the said University, shall make the number of such Fellows, exclusive as aforesaid, thirty. But nothing herein contained shall prevent the Governor-General of India in Council from nominating more than thirty persons to be Fellows of the said University if he shall see fit.

VII. The Governor-General of India in Council may cancel the appointment of any person already appointed, or hereafter to be appointed a Fellow of the University, and as soon as such order is notified in the *Gazette*, the person so appointed shall cease to be a Fellow.

VIII. The Chancellor, Vice-Chancellor, and Fellows for the time being shall have the entire management of and superintendence over the affairs, concerns, and property of the said University; and in all cases unprovided for by this Act, it shall be lawful for the Chancellor, Vice-Chancellor, and Fellows to act in such manner as shall appear to them best calculated to promote the purposes intended by the said University. The said Chancellor, Vice-Chancellor, and Fellows shall have full power from time to time to make and alter any bye-laws and regulations (so as the same be not repugnant to law, or to the general objects and provisions of this Act) touching the examination for degrees and the granting of the same; and touching the examination for honors and the granting of marks of honor for a higher proficiency in the different branches of Literature, Science, and Art; and touching the qualifications of the candidates for degrees and the previous course of instruction to be followed by them, and the preliminary examinations to be submitted to by them; and touching the mode and time of convening the meetings of the Chancellor, Vice-Chancellor, and Fellows; and, in general, touching all other matters whatever regarding the said University. And all such bye-laws and regulations, when reduced into writing, and after the common seal of the said University shall have been affixed thereto, shall be binding upon all persons, members of the said University, and all candidates for degrees to be conferred by the same, provided such bye-laws and regulations shall have been first submitted to and shall have received the approval of the Governor-General of India in Council.

IX. All questions which shall come before the Chancellor, Vice-Chancellor, and Fellows, shall be decided at a meeting of the Senate by the majority of the members present; and the Chairman at any such meeting shall have a vote, and, in case of



an equality of votes, a second or casting vote. No question shall be decided at any meeting, unless the Chancellor, or Vice-Chancellor, and five Fellows, or, in the absence of the Chancellor and Vice-Chancellor, unless six Fellows at the least, shall be present at the time of the decision. At every meeting of the Senate, the Chancellor, or in his absence the Vice-Chancellor, shall preside as Chairman; and, in the absence of both, a Chairman shall be chosen by the Fellows present, or the major part of them.

X. The said Chancellor, Vice-Chancellor, and Fellows for the time being shall have full power from time to time to appoint, and, as they shall see occasion, to remove all Examiners, Officers, and servants of the said University.

Appointment and removal of Examiners and Officers.

XI. The said Chancellor, Vice-Chancellor, and Fellows, shall have power, after examination, to confer the several degrees of Bachelor of Arts, Master of Arts, Bachelor of Laws, Licentiate of Medicine, Doctor of Medicine, and Master of Civil Engineering; they shall also have power, after examination, to confer upon the candidates for the said several degrees marks of honour for a high degree of proficiency in the different branches of Literature, Science, and Art, according to rules to be determined by the bye-laws to be from time to time made by them under the power in that behalf given to them by this Act.

Power to confer degrees.

XII. Except by special order of the Senate, no person shall be admitted as a candidate for the degree of Bachelor of Arts, Master of Arts, Bachelor of Laws, Licentiate of Medicine, Doctor of Medicine, or Master of Civil Engineering, unless he shall present to the said Chancellor, Vice-Chancellor, and Fellows, a certificate from one of the Institutions authorised in that behalf by the Governor-General of India in Council, to the effect that he has completed the course of instruction prescribed by the Chancellor, Vice-Chancellor, and Fellows of the said University, in the bye-laws to be made by them under the power in that behalf given by this Act.

Qualification for admission of candidates for degrees.

XIII. The said Chancellor, Vice-Chancellor, and Fellows shall cause an examination for degrees to be held at least once in every year; on every such examination the candidates shall be examined either by Examiners appointed for the purpose from among the Fellows by the said Chancellor, Vice-Chancellor, and Fellows, or by other Examiners so to be appointed; and on every such examination, the candidates, whether candidates for an ordinary degree or for a degree with honors, shall be examined

Examination for degrees.

on as many subjects and in such manner as the said Chancellor, Vice-Chancellor, and Fellows shall appoint.

XIV. At the conclusion of every examination of the candidates, the Examiners shall declare the Grant of degrees. name of every candidate whom they shall have deemed entitled to any of the said degrees, and his proficiency in relation to other candidates; and also the honors which he may have gained in respect of his proficiency in that department of knowledge in which he is about to graduate; and he shall receive from the said Chancellor a certificate, under the seal of the said University of Calcutta and signed by the said Chancellor or Vice-Chancellor, in which the particulars so stated shall be declared.

XV. The said Chancellor, Vice-Chancellor, and Fellows shall have power to charge such reasonable Fees. fees for the degrees to be conferred by them, and upon admission into the said University, and for continuance therein, as they, with the approbation of the Governor-General of India in Council, shall from time to time see fit to impose. Such fees shall be carried to one General Fee Fund for the payment of expenses of the said University, under the directions and regulations of the Governor-General of India in Council, to whom the accounts of income and Annual accounts. expenditure of the said University shall once in every year be submitted for such examination and audit as the said Governor-General of India in Council may direct.

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# THE INDIAN UNIVERSITIES ACT, 1904 (VIII OF 1904)

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THE FIRST SCHEDULE—*Ex-officio* FELLOWS OF THE UNIVERSITY.

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## ACT No. VIII OF 1904

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL

*(Received the assent of the Governor-General on the 24th  
March, 1904)**This Act came into force on the 1st September, 1904**An Act to amend the law relating to the Universities of  
British India*

WHEREAS by Acts II, XXII and XXVII of 1857, Act XIX of 1882 and Act XVIII of 1887, Universities were established and incorporated at Calcutta, Bombay, Madras, Lahore and Allahabad;

And whereas by Act XLVII of 1860 the Universities of Calcutta, Madras and Bombay were empowered to confer such degrees as should be appointed in the manner provided by the Act;

And whereas by Act I of 1884 the Universities of Calcutta, Madras and Bombay were further empowered to confer the honorary degree of Doctor in the Faculty of Law;

And whereas it is expedient to amend the law relating to the Universities of British India;

It is hereby enacted as follows:—

1. (1) This Act may be called the Indian Universities Act, 1904; and

(2) It shall come into force on such date as the Government may fix in this behalf by notification in the *Gazette of India*, or the local official Gazette, as the case may be.

Short title and  
commencement.

2. (1) This Act shall be deemed to be part of each of the Acts by which the said five Universities were respectively established and incorporated.

Interpretation

(2) In this Act, unless there is anything repugnant in the subject or context,—

- (a) the term “ College ” or “ affiliated College ” includes any collegiate institution affiliated to or maintained by the University:
- (b) the expression “ the Government ” means in relation to the University of Calcutta the Governor-General in Council and in relation to the other Universities the Local Government: and
- (c) the expression “ the University ” and “ the Act of Incorporation ” and any expression denoting any University, authority or officer or any statute, regulation, rule or bye-law of the University shall be construed with reference to each of the said Universities respectively.

### *The University*

3. The University shall be and shall be deemed to have been incorporated for the purpose (among others) of making provision for the instruction of students, with power to appoint University Professors and Lecturers, to hold and manage educational endowments, to erect, equip and maintain University libraries, laboratories and museums, to make regulations relating to the residence and conduct of students, and to do all acts, consistent with the Act of Incorporation and this Act, which tend to the promotion of study and research.

4. (1) Notwithstanding anything contained in the Act of Incorporation, the Body Corporate of the University shall consist of—

- (a) the Chancellor;
- (b) in the case of the University of Calcutta, the Rector;
- (c) the Vice-Chancellor;
- (d) the *Ex-officio* Fellows; and
- (e) the Ordinary Fellows—
  - (i) elected by registered Graduates or by the Senate,
  - (ii) elected by the Faculties, and
  - (iii) nominated by the Chancellor.

(2) The Ordinary Fellows shall, save as herein otherwise provided, hold office for five years:

Provided that an Ordinary Fellow who has vacated his office may, subject to the provisions of this Act, be elected or nominated to be an Ordinary Fellow.

(3) The Body Corporate shall be the Senate of the University, and all powers which are by the Act of Incorporation or by this Act conferred upon the Senate, or upon the Chancellor, Vice-Chancellor and Fellows in their corporate capacity, or, in the case of the University of Calcutta, upon the Chancellor, Rector, Vice-Chancellor and Fellows in their corporate capacity, shall be vested in, and exercised by, the Senate constituted under this Act, and all duties and liabilities imposed upon the University by the Act of Incorporation shall be deemed to be imposed upon the Body Corporate as constituted under this Act.

(4) No act done by the University shall be deemed to be invalid merely by reason of any vacancy among either class of elected Ordinary Fellows, or by reason of the total number of Ordinary Fellows or of members of the profession of education to be included among Ordinary Fellows, being less than the minimum prescribed by this Act.

### *Fellows*

5. (1) Notwithstanding anything contained in the Act of Incorporation, the persons for the time being performing the duties of the offices mentioned in the list contained in the first schedule to this Act or added to the said list under sub-section (2) shall be the *ex-officio* Fellows of the University.

(2) The Government may, by notification published in the *Gazette of India* or in the local official Gazette, as the case may be, make additions to, or alterations in, the list of offices contained in the said schedule:

Provided that the number of *ex-officio* Fellows shall not exceed ten.

6. (1) In the case of the Universities of Calcutta, Bombay and Madras, the number of Ordinary Fellows shall not be less than fifty nor exceed one hundred; and of such number—

(a) ten shall be elected by registered Graduates;

(b) ten shall be elected by the Faculties; and

(c) the remainder shall be nominated by the Chancellor.

(2) In the case of the Universities of the Punjab and Allahabad, the number of Ordinary Fellows shall not be less than forty nor exceed seventy-five; and of such number—

(a) ten shall be elected by the Senate or by registered Graduates;

(b) five shall be elected by the Faculties; and

(c) the remainder shall be nominated by the Chancellor.

(3) The election of any Ordinary Fellow shall be subject to the approval of the Chancellor.

(4) Elections of the Ordinary Fellows by the Faculties and nominations of such Fellows by the Chancellor under this section shall be made in such manner as to secure that not less than two-fifths of the Fellows so elected and so nominated respectively shall be persons following the profession of education.

7. (1) Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by registered Graduates.

(2) The Syndicate shall maintain a register on which any Graduate who (a) has taken the degree of Doctor or Master in any Faculty, or (b) has graduated in any Faculty not less than ten years before registration, shall, subject to the payment of an initial fee of such amount as may be prescribed by the regulations, be entitled to have his name entered upon application made within the period of three years from the commencement of this Act or of one year from the date on which he becomes so entitled:

Provided that, if such application is made after the expiry of either of the said periods, the applicant shall be entitled to have his name entered on payment of the said initial fee, and of such further sum as may be prescribed by the regulations.

(3) The name of any Graduate entered on the register shall, subject to the payment of an annual fee of such amount as may be prescribed by the regulations, be retained thereon, and, in case of default, shall be removed therefrom, but shall, at any time, be re-entered upon payment of all arrears:

Provided that a Graduate whose name has been already entered on the register may at any time compound for all subsequent payments of the annual fee by paying the sum prescribed in this behalf by the regulations.

(4) No person other than a Graduate whose name is entered on the said register shall be qualified to vote or to be elected at an election held under sub-section (1).

(5) A Graduate registered under this section shall be entitled to such further privileges as may be determined by the regulations.

8. (1) The provisions of Section 7 shall not apply to the University of the Punjab or to the University of Allahabad until the Chancellor, with the previous sanction of the Governor-General in Council and by notification in the local official Gazette, so directs; and until such time the Ordinary Fellows of the said Universities, who would be elected by registered Graduates if the said provisions were in force, shall be elected by the Senate.

(2) In the case of the University of the Punjab and the University of Allahabad, there shall, if necessary, be an election, once in every year, on such date as the Chancellor may appoint in this behalf, to fill any vacancy among the Ordinary Fellows elected by the Senate.

9. (1) Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by the Faculties.

(2) An election under sub-section (1) shall be held, subject to such directions prescribing the qualifications of the persons to be elected as may, from time to time, be given by the Chancellor, with a view to secure the return of duly qualified persons and the fair representation of different branches of study in the Senate.

10. Subject to the provisions of Section 6, the Chancellor may nominate any number of fit and proper persons to be Ordinary Fellows.

11. (1) Any Ordinary Fellow may, by a letter addressed to the Chancellor, resign his office.

(2) Where any Ordinary Fellow has not attended a meeting of the Senate, other than a Convocation, during the period of one year, the Chancellor may declare his office to be vacated.

### *Transitory Provisions*

12. In their application to the election and nomination of Ordinary Fellows within one year after commencement of Act, and temporary continuance of existing University administration. Ordinary Fellows within the period of one year after the commencement of this Act and to the current business of the University, the provisions of this Act shall be read as subject to the following restrictions and modifications:—

(a) In the case of the Universities of Calcutta, Bombay and Madras, the Chancellor shall, as soon as may be after the commencement of this Act, make an order directing that the Ordinary Fellows, who under the said provisions are to be elected by Registered Graduates, shall be elected by the elected Fellows holding office at the commencement of the Act, or by such Graduates of the University as the Chancellor may determine, or partly by elected Fellows and partly by such Graduates, and in such manner as the Chancellor may direct.

(b) When the Ordinary Fellows mentioned in clause (a)



- have been elected, the Chancellor shall proceed to the nomination of Ordinary Fellows under Section 6, sub-section (1), clause (c).
- (c) The Ordinary Fellows mentioned in clauses (a) and (b) shall, as soon as may be after their appointment and in such manner as the Chancellor may direct, elect the Fellows who under the said provisions are to be elected by the Faculties.
  - (d) In the case of the Universities of the Punjab and Allahabad, the Chancellor shall, as soon as may be after the commencement of this Act, proceed to nominate Ordinary Fellows under Section 6, sub-section (2), clause (c).
  - (e) When Ordinary Fellows have been appointed under clause (d), the Chancellor shall make an order directing that the Fellows who under the said provisions are to be elected by the Senate, shall be elected by the Ordinary Fellows appointed under clause (d), or by elected Fellows holding office at the commencement of this Act, or partly by such Ordinary Fellows and partly by elected Fellows, in such manner as the Chancellor may direct.
  - (f) The Ordinary Fellows mentioned in clauses (d) and (e) shall, as soon as may be after their appointment, and in such manner as the Chancellor may direct, elect the Fellows who under the said provisions are to be elected by the Faculties.
  - (g) An election under clause (c) or clause (f) shall be made subject to such directions prescribing the qualifications of the persons to be elected as may be given by the Chancellor, with a view to secure the return of duly qualified persons and a fair representation of different branches of study in the Senate.
  - (h) As soon as Ordinary Fellows have been nominated and elected under clauses (a), (b) and (c), or under clauses (d), (e) and (f), as the case may be, and the persons so elected have been approved by the Chancellor, the Chancellor shall declare that the Body Corporate of the University has been constituted in accordance with the provisions of this Act, and shall append to the declaration a list of the Senate, and shall forward the said declaration and the appended list to the Governor-General in Council, who shall cause the declaration and the list to be published in the *Gazette of India*.
  - (i) The seniority of the Fellows included in the list mentioned in clause (h) shall be determined by the order in which their names appear in the list.

- (j) Until the said declaration is published under clause (h) the Fellows holding office at the commencement of this Act shall, together with the Chancellor and the Vice-Chancellor, continue to be the Senate of the University, and shall be entitled to exercise the powers conferred upon them by the Act of Incorporation.
- (k) Every Ordinary Fellow elected or nominated under this section shall, unless his Fellowship is previously vacated by death, resignation or any other cause, hold office for not less than three years.
- (l) At or about the end of the third year from the publication of declaration mentioned in clause (h), the names of, as nearly as may be, one-fifth of the total initial number—
  - (i) of Ordinary Fellows elected under clause (a) or clause (e), as the case may be,
  - (ii) of Ordinary Fellows elected under clause (c) or clause (f), and
  - (iii) of Ordinary Fellows nominated by the Chancellor,(after deducting from the said one-fifth the names in each class which have previously been removed from the list mentioned in clause (h) by reason of death, resignation or any other cause) shall be drawn by lot from among the elected and the nominated Ordinary Fellows whose names were included in the list mentioned in clause (h), and those whose names are so shown shall thereupon cease to be Ordinary Fellows.
- (m) At or about the end of the fourth, fifth and sixth years from the publication of the said declaration, the names of Ordinary Fellows shall be drawn by lot from each class of Ordinary Fellows included in the said list, in the manner provided in clause (l), so as to secure that, as nearly as may be, one-fifth of the Fellowships of the Ordinary Fellows so included in each class shall be vacated in each year.
- (n) An Ordinary Fellow elected or nominated under this section, who has not previously vacated his Fellowship, shall cease to be a Fellow at the end of the seventh year from the publication of the said declaration.
- (o) The Vice-Chancellor holding office at the commencement of this Act shall continue to hold office until the publication of the said declaration, and shall, if he is a member of the Senate as constituted under this Act, continue to hold office as Vice-Chancellor for the remainder of the term for which he was originally appointed.

- (p) The members of the Syndicate holding office at the commencement of this Act shall continue to conduct the executive business of the University until the publication of the said declaration; and, upon such publication, the Senate shall, in such manner as the Chancellor may direct, appoint a provisional Syndicate to conduct the executive business of the University until the Syndicate has been constituted under this Act.
- (q) The Senate as constituted under this Act may give orders for the provisional constitution of Faculties, Boards of Studies and of any Board or Committee of the Senate, pending the constitution of such Faculties, Boards and Committees, in conformity with the regulations.
- (r) University Examiners and all officers and servants of the University shall continue to hold office and to act, subject to the conditions governing their tenure of office or employment, except in so far as such conditions may be altered by competent authority.
- (s) The statutes, regulations and bye-laws of the University in force at the commencement of this Act shall continue to be in force, except in so far as the said statutes, regulations and bye-laws shall be altered or repealed by competent authority.

#### *Honorary Fellows*

13. (1) (a) A Fellow holding office at the commencement of this Act shall cease to be a Fellow.

Honorary Fellows. (b) Where a Fellow included in clause (a) does not become a Fellow under this Act, he shall be an Honorary Fellow for life.

(c) Where a Fellow included in clause (a) becomes a Fellow under this Act, he shall, whenever and so often as he ceases to be a Fellow under this Act, become an Honorary Fellow as provided in clause (b).

(2) The Chancellor may nominate any person to be an Honorary Fellow for life, who is eminent for his attainments in any branch of learning, or is an eminent benefactor of the University, or is distinguished for services rendered to the cause of education generally.

(3) Notwithstanding anything contained in this section, any Fellow who at the commencement of this Act is entitled as such to vote for the election of any person to be a member of any Council for the purpose of making laws and regulations or of any local authority shall continue to be so entitled as if this Act had not been passed.

*Faculties and Syndicate*

14. (1) Nothing contained in the Act of Incorporation shall be deemed to prohibit the constitution of a new Faculty or the abolition or reconstitution of any existing Faculty by the Senate under regulations made in accordance with the provisions of this Act.

(2) Regulations made under sub-section (1) may—

- (a) provide for the assignment of Fellows to the several Faculties by order of the Senate; and
- (b) empower the Fellows so assigned to add to their number, in such manner and for such period as may be prescribed, Graduates in the Faculty and other persons possessing special knowledge of the subjects of study represented by the Faculty:

Provided that the number of persons so to be added to the Faculty shall not exceed half the number of Fellows assigned to the Faculty.

(3) A person added to a Faculty under sub-section (2), clause (b), shall have the right to take part in the ordinary business of the Faculty, and in any election of an Ordinary Fellow by the Faculty, but shall not be entitled to take part in the election of the Syndicate.

15. (1) The executive government of the University shall be vested in the Syndicate, which shall consist of—

- (a) the Vice-Chancellor as Chairman;
- (b) the Director of Public Instruction for the Province in which the headquarters of the University are situated; and, in the case of the University of Allahabad, also the Director of Public Instruction in the Central Provinces; and
- (c) not less than seven or more than fifteen *ex-officio* or Ordinary Fellows, elected by the Senate or by the Faculties in such manner as may be provided by the regulations, to hold office for such period as may be prescribed by the regulations.

(2) The regulations referred to in sub-section (1) shall be so framed as to secure that a number, not falling short by more than one of a majority of the elected members of the Syndicate, shall be Heads of, or Professors in, Colleges affiliated to the University.

(3) If in the case of any election the question is raised whether any person is or is not a Professor within the meaning of sub-section (2), the question shall be decided by the Senate.

*Degrees*

16. The Senate may institute and confer such degrees, and grant such diplomas, licenses, titles and marks of honour in respect of degrees and examinations as may be prescribed by regulation.

17. Where the Vice-Chancellor and not less than two-thirds of the other members of the Syndicate recommend that an honorary degree be conferred on any person on the ground that he is, in their opinion, by reason of eminent position and attainments, a fit and proper person to receive such a degree, and where their recommendation is supported by not less than two-thirds of the Fellows present at a meeting of the Senate and is confirmed by the Chancellor, the Senate may confer on such person the honorary degree so recommended without requiring him to undergo any examination.

18. Where evidence is laid before the Syndicate showing that any person on whom a degree, diploma, license, title or mark of honour conferred or granted by the Senate has been convicted of what is, in their opinion, a serious offence, the Syndicate may propose to the Senate that the degree, diploma, license, title or mark of honour be cancelled, and, if the proposal is accepted by not less than two-thirds of the Fellows present at a meeting of the Senate and is confirmed by the Chancellor, the degree, diploma, license, title or mark of honour shall be cancelled accordingly.

*Affiliated Colleges*

19. Save on the recommendation of the Syndicate, by special order of the Senate, and subject to any regulations made in this behalf, no person shall be admitted as a candidate at any University examination, other than an examination for Matriculation, unless he produces a certificate from a College affiliated to the University, to the effect that he has completed the course of instruction prescribed by regulation.

20. Any College affiliated to the University before the passing of this Act may continue to exercise the rights conferred upon it by such affiliation, save in so far as such rights may be withdrawn or restricted in the exercise of any power conferred by the Act of Incorporation or by this Act.

21. (1) A College applying for affiliation to the University shall send a letter of application to the Registrar, and shall satisfy the Syndicate—  
**Affiliation.**

- (a) that the College is to be under the management of a regularly constituted governing body;
- (b) that the qualifications of the teaching staff and the conditions governing their tenure of office are such as to make due provision for the courses of instruction to be undertaken by the College;
- (c) that the buildings in which the College is to be located are suitable, and that provision will be made, in conformity with the regulations, for the residence, in the College or in lodgings approved by the College, of students not residing with their parents or guardians, and for the supervision and physical welfare of students;
- (d) that due provision has been or will be made for a library;
- (e) where affiliation is sought in any branch of experimental science, that arrangements have been or will be made in conformity with the regulations for imparting instruction in that branch of science in a properly equipped laboratory or museum;
- (f) that due provision will, so far as circumstances may permit, be made for the residence of the Head of the College and some members of the teaching staff in or near the College or the place provided for the residence of students;
- (g) that the financial resources of the College are such as to make due provision for its continued maintenance;
- (h) that the affiliation of the College, having regard to the provision made for students by other Colleges in the same neighbourhood, will not be injurious to the interests of education or discipline; and
- (i) that the College rules fixing the fees (if any) to be paid by the students have not been so framed as to involve such competition with any existing College in the same neighbourhood as would be injurious to the interests of education.

The application shall further contain an assurance that after the College is affiliated any transference of management and all changes in the teaching staff shall be forthwith reported to the Syndicate.

(2) On receipt of a letter of application under sub-section (1), the Syndicate shall—

- (a) direct a local inquiry to be made by a competent person authorized by the Syndicate in this behalf;

- (b) make such further inquiry as may appear to them to be necessary; and
- (c) report to the Senate on the question whether the application should be granted or refused, either in whole or in part, embodying in such report the results of any inquiry under clauses (a) and (b).

And the Senate shall, after such further inquiry (if any), as may appear to them to be necessary, record their opinion on the matter.

(3) The Registrar shall submit the application and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry as may appear to them to be necessary, shall grant or refuse the application or any part thereof.

(4) Where the application or any part thereof is granted, the order of the Government shall specify the courses of instruction in respect of which the College is affiliated; and, where the application or any part thereof is refused, the grounds of such refusal shall be stated.

(5) An application under sub-section (1) may be withdrawn at any time before an order is made under sub-section (3).

22. Where a College desires to add to the courses of instruction in respect of which it is affiliated, the procedure prescribed by Section 21 shall, so far as may be, be followed.

23. (1) Every College affiliated to the University, whether before or after the commencement of this Act, shall furnish such reports, returns and other information as the Syndicate may require to enable it to judge of the efficiency of the College.

(2) The Syndicate shall cause every such College to be inspected from time to time by one or more competent persons authorized by the Syndicate in this behalf.

(3) The Syndicate may call upon any College so inspected to take, within a specified period, such action as may appear to them to be necessary in respect of any of the matters referred to in Section 21, sub-section (1).

24. (1) A member of the Syndicate who intends to move that the rights conferred on any College by affiliation be withdrawn, in whole or in part, shall give notice of his motion, and shall state in writing the grounds on which the motion is made.

(2) Before taking the said motion into consideration, the Syndicate shall send a copy of the notice and written statement mentioned in sub-section (1) to the Head of the College concerned, together with an intimation that any representation in writing submitted, within a period specified in such intimation, on behalf of the College, will be considered by the Syndicate :

Provided that the period so specified may, if necessary, be extended by the Syndicate.

(3) On receipt of the representation or on expiration of the period referred to in sub-section (2), the Syndicate, after considering the notice of motion, statement and representation and after such inspection by any competent person authorized by the Syndicate in this behalf, and such further inquiry as may appear to them to be necessary, shall make a report to the Senate.

(4) On receipt of the report under sub-section (3), the Senate shall, after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

(5) The Registrar shall submit the proposal and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry (if any) as may appear to them to be necessary, shall make such order as the circumstances may, in their opinion, require.

(6) Where by an order made under sub-section (5) the rights conferred by affiliation are withdrawn, in whole or in part, the grounds for such withdrawal shall be stated in the order.

### *Regulations*

25. (1) The Senate, with the sanction of the Government, may from time to time make regulations consistent with the Act of Incorporation as amended by this Act and with this Act to provide for all matters relating to the University.

(2) In particular, and without prejudice to the generality of the foregoing power, such regulations may provide for—

- (a) the procedure to be followed in holding any election of Ordinary Fellows;
- (b) the constitution, reconstitution or abolition of Faculties, the proportion in which the members, other than the *ex-officio* members, or the Syndicate shall be elected to represent the various Faculties and the mode in which such election shall be conducted;
- (c) the procedure at meetings of the Senate, Syndicate and Faculties and the quorum of members to be required for the transaction of business;
- (d) the appointment of Fellows and others to be members of Boards of Studies, and the procedure of such Boards and the quorum of members to be required for the transaction of business;
- (e) the appointment and duties of the Registrar and of officers and servants of the University, and of Professors and Lecturers appointed by the University;



- (f) the appointment of **Examiners**, and the duties and powers of **Examiners**, in relation to the examinations of the University;
- (g) the form of the certificate to be produced by a candidate for examination under Section 19 and the conditions on which any such certificate may be granted;
- (h) the registers of graduates and students to be kept by the University, and the fee (if any) to be paid for the entry or retention of a name on any such register;
- (i) the inspection of Colleges and the reports, returns and other information to be furnished by Colleges;
- (j) the registers of students to be kept by Colleges affiliated to the University;
- (k) the rules to be observed and enforced by Colleges affiliated to the University in respect of the transfer of students;
- (l) the fees to be paid in respect of the courses of instruction given by Professors or Lecturers appointed by the University;
- (m) the residence and conduct of students;
- (n) the courses of study to be followed and the conditions to be complied with by candidates for any University examination, other than an examination for Matriculation, and for degrees, diplomas, licenses, titles, marks of honour, scholarships and prizes conferred or granted by the University;
- (o) the conditions to be complied with by schools desiring recognition for the purpose of sending up pupils as candidates for the Matriculation Examination and the conditions to be complied with by candidates for Matriculation, whether sent up by recognised schools or not;
- (p) the conditions to be complied with by candidates, not being students of any College affiliated to the University, for degrees, diplomas, licenses, titles, marks of honour, scholarships and prizes conferred or granted by the University; and
- (q) the alteration or cancellation of any rule, regulation, statute or bye-law of the University in force at the commencement of this Act.

26. (1) Within one year after the commencement of this Act or within such further period as the Government may fix in this behalf,—

- (a) the Senate as constituted under this Act shall cause a revised body of regulations to be prepared and submitted for the sanction of the Government;

- (b) if any additions to, or alterations in, the draft submitted appear to the Government to be necessary, the Government, after consulting the Senate, may sanction the proposed body of regulations with such additions and alterations as appear to the Government to be necessary.

(2) Where a draft body of regulations is not submitted by the Senate within the period of one year after the commencement of this Act, or within such further period as may be fixed under sub-section (1), the Government may, within one year after the expiry of such period or of such further period, make regulations which shall have the same force as if they had been prepared and sanctioned under sub-section (1).

### *Miscellaneous*

27. The Governor-General in Council may, by general or special order, define the territorial limits within which, and specify the Colleges in respect of which, any powers conferred by or under the Act of Incorporation or this Act shall be exercised.

28. (1) The Lieutenant-Governor of Bengal, for the time being, shall be the Rector of the University of Calcutta, and shall have precedence in any Convocation of the said University next after the Chancellor and before the Vice-Chancellor.

(2) The Chancellor may delegate any power conferred upon him by the Act of Incorporation or this Act to the Rector.

29. The Acts mentioned in the second schedule are hereby repealed to the extent specified in the fourth column thereof.

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## THE FIRST SCHEDULE

(Section 5)

### *Ex-officio* FELLOWS OF THE UNIVERSITY

#### *The University of Calcutta*

The Chief Justice of the High Court of Judicature at Fort William in Bengal.

The Lord Bishop of Calcutta.

The Civil Ordinary Members of the Council of the Governor-General.

The Directors of Public Instruction, Bengal, Burma and Assam.

*The University of Bombay*

The Chief Justice of the High Court of Judicature at Bombay.

The Bishop of Bombay.

The Ordinary Members of the Council of the Governor of Bombay.

The Director of Public Instruction in Bombay.

*The University of Madras*

The Chief Justice of the High Court of Judicature at Madras.

The Bishop of Madras.

The Ordinary Members of the Council of the Governor of Madras.

The Director of Public Instruction in Madras.

*The University of the Punjab*

The Chief Judge of the Chief Court of the Punjab.

The Bishop of Lahore.

The Director of Public Instruction in the Punjab.

The representatives of such Chiefs (if any) of territories not comprised in British India as the Local Government may, by notification in local official Gazette, specify in this behalf.

*The University of Allahabad*

The Chief Justice of the High Court of Judicature for the North-Western Provinces.

The Bishop of Lucknow.

The Directors of Public Instruction in the United Provinces of Agra and Oudh and in the Central Provinces.

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## THE SECOND SCHEDULE

(Section 29)

## ENACTMENTS REPEALED

Year.	No.	Short title.	Extent of repeal.
1857	II	The Calcutta University Act, 1857.	<p>In section 2, the word "said" wherever it occurs.</p> <p>In section 3, the first sentence and the words "Provided that."</p> <p>In section 5, the words "in the Calcutta Gazette."</p> <p>Section 6.</p> <p>Section 8, except the first sentence.</p> <p>Sections 9, 10, 11, 12, 13 and 14.</p>
1857	XXII	The Bombay University Act, 1857.	<p>In section 2, the word "said" wherever it occurs.</p> <p>In section 3, the first sentence and the words "Provided that."</p> <p>Section 6.</p> <p>Section 8, except the first sentence.</p> <p>Sections 9, 10, 11, 12, 13 and 14.</p>
1857	XXVII	The Madras University Act, 1857.	<p>In section 2, the word "said" wherever it occurs.</p> <p>In section 3, the first sentence and the words "Provided that."</p> <p>Section 6.</p> <p>Section 8, except the first sentence.</p> <p>Sections 9, 10, 11, 12, 13 and 14.</p>
1860	XLVII	The Indian Universities (Degrees) Act, 1860.	The whole Act.
1882	XIX	The Punjab University Act, 1882.	<p>Section 6.</p> <p>In section 7, sub-section (1).</p> <p>In section 8, in sub-section (1), the words after the word "Fellow" to the end of the sub-section, and in sub-section (2), the words from the word "appointed" to the words "this Act."</p> <p>In section 9, the words "under this Act."</p>

Year.	No.	Short title.	Extent of repeal.
1882	XIX	The Punjab University Act, 1882.	<p>Sections 10 and 11.</p> <p>Section 12, except the last paragraph</p> <p>Sections 13, 14, 15, 16 and 18.</p> <p>In section 20, the words "made or," "section six, clauses (b) and (c) and " and "under sections fourteen, fifteen and sixteen."</p> <p>In the Schedule, Part I.</p>
1884	I	The Indian Universities (Honorary Degrees) Act, 1884.	The whole Act.
1887	XVIII	The Allahabad University Act, 1887.	<p>Section 5.</p> <p>In section 6, sub-section (1).</p> <p>In section 7, sub-section (1) and in sub-section (2), the words after the word, "Fellow" to the end of the sub-section.</p> <p>Sections 10, 11, 12, 13, 14, 15 and 17.</p> <p>In section 20, the words and figures "appointments made and," "under section 5, sub-section (1), clauses (b) and (c)," "under sections 14 and 15" and "under section 17."</p> <p>In the Schedule, Part I.</p>

## ACT No. II of 1905

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL

*(Received the assent of the Governor-General on the  
10th February, 1905)*

*An Act to validate action taken under the Indian  
Universities Act, 1904*

Whereas the Indian Universities Act, 1904 (VIII of 1904), authorizes the Chancellor of each of the Indian Universities to make directions, declarations and orders with a view to the constitution of the Body Corporate and the appointment of the Provisional Syndicate thereof;

And whereas various directions, declarations and orders have been made in pursuance of the said authority, and Bodies Corporate and Provisional Syndicates have been constituted and appointed thereunder;

And whereas doubts have been raised as to the construction of the said Act and as to the validity of some of the said directions, declarations and orders and as to the validity of the constitution and appointment of some of the Bodies Corporate and Provisional Syndicates, and it is expedient to remove such doubts;

It is hereby enacted as follows:—

1. This Act may be called the Indian Universities (Validation) Act, 1905.  
Short title.
  2. All directions, declarations and orders made as aforesaid shall be deemed to have been duly made under the Indian Universities Act, 1904 (VIII of 1904).  
Validation of directions, declarations and orders.
  3. The Bodies Corporate and Provisional Syndicates constituted and appointed as aforesaid shall be deemed to have been duly constituted and appointed under the said Act.  
Validation of constitution and appointment of Bodies.
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## ACT No. XI OF 1911

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL

*(Received the assent of the Governor-General on the  
21st March, 1911)*

*An Act to amend the Indian Universities Act, 1904  
(VIII of 1904)*

Whereas it is expedient to amend the Indian Universities Act, 1904;

It is hereby enacted as follows:—

1. This Act may be called the Indian Universities Short title. (Amendment) Act, 1911.

2. To Section 6, sub-section (2), of the said Act the following proviso should be added, namely:—

“ Provided that in the case of the University of Allahabad the Chancellor may direct that such number as he may specify of the Ordinary Fellows referred to in clause (a) shall be elected by the Senate and the remainder by registered Graduates.”

Amendment of Section 6, Act VIII of 1904.

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## ACT NO. VII OF 1921

PASSED BY THE INDIAN LEGISLATIVE ASSEMBLY

(Received the assent of the Governor-General on the  
27th March, 1921)

An Act to amend the law relating to the Calcutta University		THE SCHEDULE	
Whereas it is expedient to amend the law relating to the Calcutta University;		(SEE SECTION 4)	
It is hereby enacted as follows :		1	2
1. This Act may be called the Calcutta University Act, 1921.		Sec.	Extent of repeal
2. In Section 4 of the Calcutta University Act, 1857, (hereinafter referred to as the said Act), for the words "Governor-General of India," the words "Governor of the Presidency of Fort William in Bengal" shall be substituted.		2	In clause (b) of sub-section (2), the words "in relation to the University of Calcutta the Governor-General in Council, and in relation to the other Universities."
3. In Sections 5, 7 and 15 of the said Act, for the words "Governor-General of India in Council" in all places where they occur, the words "Local Government of Bengal" shall be substituted.		4	Clause (b) of sub-section (1)—the whole—and in sub-section (3) the words "or in the case of the University of Calcutta, upon the Chancellor, Rector, Vice-Chancellor and Fellows in their corporate capacity."
4. The Sections of Indian Universities Act, 1904, which are specified in the first column of the Schedule, are hereby repealed to the extent specified in the second column thereof.		5	In sub-section (2), the words "in the Gazette of India or" and the words "as the case may be."
		28	The whole.



## (SECTION 5 OF INDIAN UNIVERSITIES ACT, 1904)

## FIRST SCHEDULE

*Ex-officio* FELLOWS OF THE UNIVERSITY*The University of Calcutta*

In supersession of all previous notifications on the subject, the Government of Bengal (Ministry of Education) is pleased to appoint the following to be *ex-officio* Fellows of the University of Calcutta under Section 5, sub-section (2) of the Indian Universities Act, 1904 (VIII of 1904), as amended by Act VII of 1921 :—

His Excellency the Governor of Assam, Shillong.

The Chief Justice of the High Court of Judicature at Fort William in Bengal.

Lord Bishop of Calcutta and Metropolitan of India.

The Member of the Council of the Governor-General in charge of the Department of Education.

The Member of the Executive Council of the Government of Bengal or the Minister appointed by the Governor to be in charge of the Department of Education.

The Minister for Education, Assam.

The Secretary to the Government of Bengal, Education Department.

The Director of Public Instruction, Bengal.

The Director of Public Instruction, Assam.

The Principal, Presidency College, Calcutta.

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No. F. 55-i(vi)38-E

## GOVERNMENT OF INDIA

DEPARTMENT OF EDUCATION, HEALTH AND LANDS

*New Delhi, the 7th April, 1938*

## NOTIFICATION

(EDUCATION)

In exercise of the powers conferred by sub-section (1) of section 124 of the Government of India Act, 1935, the Central Government is pleased, with effect from the 1st day of April, 1938, to entrust to the Provincial Government of Bengal, with their consent, the functions of the Central Government under the provisions specified in the first column of the Schedule, subject to such condition, if any, as is specified in respect of functions under any of said provisions in the corresponding entry in the second column of the said schedule.

## SCHEDULE

1 Provisions under which functions entrusted.	2 Condition subject to which functions entrusted.
<div>Enactment                      Section</div> <div>The Calcutta University      5</div> <div>Act, 1857 (II of 1857)</div>	...
<div>7</div> <div>15</div>	<div>The Provincial Government shall not exercise the power to cancel the appointment of Fellows save with the concurrence of the Chancellor.</div> <div>...</div>
<div>The Indian Universities      Sub-sections</div> <div>Act, 1904 (VIII of 1904).      (3) &amp; (4) of</div> <div>   Section 21</div> <div>22</div>	<div>The Provincial Government of Bengal shall not pass orders save with the concurrence of the Government of the province wherein the college concerned is situated. In the event of disagreement between the two Governments, the matter shall be referred to the Central Government for orders.</div>
<div>Sub-sections</div> <div>(5) &amp; (6) of</div> <div>Section 24</div>	...
<div>Sub-section</div> <div>(1) of</div> <div>Section 25</div>	...

G. S. BAJPAI,  
*Secretary.*



# NEW REGULATIONS

## CHAPTER I

### THE SENATE

1. The Senate shall meet ordinarily once a year in the month of January and may meet at other times if convened by the Vice-Chancellor, or, in his absence from Calcutta, or when the office of Vice-Chancellor is vacant, by the Senior Ordinary Fellows present in Calcutta.

2. The *ex-officio* Fellows of the University are always the Senior Fellows in order of official precedence. The seniority of all Ordinary Fellows is according to the date and order of their first appointment under the Indian Universities Act, 1904.

3. The Vice-Chancellor, or, in his absence, or when the office of Vice-Chancellor is vacant, the Senior Ordinary Fellow present in Calcutta shall convene a meeting of the Senate on the requisition of any six Fellows.

4. No question shall be brought under the consideration of the Senate which has not first been considered by the Syndicate.

5. Except in the case of urgent business, twelve clear days' notice shall be given of every meeting.

6. The Registrar shall, with notice, issue an agenda paper showing the business to be brought before the meeting, the terms of all resolutions to be proposed of which notice in writing has previously reached him, and the names of the proposers. Notices in writing of additional resolutions and of proposed amendments and the terms thereof should reach the Registrar four clear days before the day of such meeting.

7. The Registrar shall also two clear days before the day of meeting, forward to each member of the Senate an agenda paper showing all the motions and amendments and any additional business proposed by the Syndicate; and no motion and, unless expressly sanctioned by a majority of the members present, no amendment, of which such notice has not been given, shall be put to the meeting, other than a motion for any change in the order of business, a motion for dissolution, or adjournment, or for putting the question to vote, or for passing to the next business on the agenda paper, or for directing the Syndicate to review their decision or an amendment which may be

accepted by the Chairman as merely formal. The adjournment of a debate may, however, be moved for the purpose of giving notice of an amendment which has been disallowed.

8. Fifteen members of the Senate shall constitute a quorum, and all questions shall be decided by a majority of the votes of the members present.

9. The Chancellor, or, in his absence, the Vice-Chancellor, shall preside at meetings of the Senate, or, if the Vice-Chancellor be not present, a Chairman for the occasion shall be elected by the members present. If the votes, including that of the Chairman, are equally divided, the Chairman shall have a casting vote.

### ORDER OF BUSINESS

10. At the time appointed for the meeting, the Registrar shall take notice whether a quorum is present. If there is not, and if a quorum is not present within fifteen minutes, no meeting shall be held.

11. If at any time during the progress of business, any member shall call attention to the fact that there is not a quorum present, the meeting shall forthwith be dissolved. Such dissolutions shall be recorded by the Registrar under the signature of the Chairman.

12. At every meeting the business shall be taken in the following order:

- (i) The election, if necessary, of the Chairman.
- (ii) University appointments.
- (iii) Any motion for a change in the order of business.
- (iv) Matters brought forward by the Syndicate.
- (v) Other business

### RULES OF DEBATE

#### (i) *Motions*

13. Every motion shall be affirmative in form, and shall begin with the word 'that'.

14. Every motion at a meeting must be seconded; otherwise it shall drop.

15. When a motion has been seconded, it shall be stated from the Chair unless it be ruled out of order.

16. When the motion has been thus stated, it may be discussed as a question to be resolved either in the affirmative or

in the negative, or as proposed to be varied by way of amendment. When no Fellow rises to speak to the motion, the Chairman shall proceed to put the question to the vote in the manner hereinafter mentioned.

17. Not more than one motion and one amendment there-to shall be placed before the meeting at the same time.

18. A motion once disposed of shall not be again brought forward at the same meeting, or at any adjournment thereof. A motion substantially identical in part with one already disposed of may be brought forward with the omission of such part.

### (ii) *Amendments*

19. Any proposal before the meeting may be amended (a) by leaving out a word or words; (b) by leaving out a word or words in order to add or insert some other word or words; (c) by adding or inserting a word or words.

When the amendment is of the first kind, the form in which it will be proposed and handed to the Chair will be, "That the words (mentioning them) be left out of the question."

When the amendment is of the second kind, the form will be, "That the words (mentioning them) be left out of the question, in order to add (or insert) the words (mentioning them)."

When the amendment is of the third kind, the form will be, "That the words (mentioning them) be added (or inserted)."

20. No amendment shall be proposed which would in effect constitute a direct negative to the original motion, or which would alter the first word.

21. Every amendment must be relevant to the motion upon which it is moved.

22. No amendment shall be proposed which substantially raises a question already disposed of by the meeting, or which is inconsistent with any resolution already passed by it.

23. An amendment, the substance of which has been disposed of in part, may be modified by its proposer so as to retain only the part not so disposed of.

24. The order in which amendments of which previous notice has been given are to be brought forward shall be determined by the Chairman.

25. An amendment must be seconded in the same way as a motion; otherwise it shall drop. A seconder of an amendment may reserve his speech with the permission of the Chairman.

26. When an amendment has been moved and seconded it shall, unless ruled out of order, be stated from the Chair

and then the debate may proceed on the original motion and the amendment together.

27. When the Chairman has ascertained that no other Fellow entitled to address the meeting desires to speak, the mover of the original resolutions may reply upon the whole debate. But the mover of an amendment, or of a motion for dissolution or adjournment, or of a motion to pass to the next business on the agenda paper has no right of reply.

28. No Fellow shall speak to the question after the mover has entered on his reply.

29. When the debate is concluded the Chairman shall after summing up, if he so desires, put the question to the vote thus:

If there is no amendment, the Chairman shall say, "The question is" and state the motion, and shall then take the votes of the meeting.

If there is an amendment, the Chairman shall say, "It has been moved" and shall state the motion; then he shall say, "Since which it has been moved by way of amendment"

- (a) "that the following word or words be omitted" (if the amendment is one of the first kind);
- or (b) "that the following word or words be omitted, and that the following word or words be added or inserted," indicating where such words are to be added or inserted (if the amendment is of the second kind);
- or (c) "that the following word or words be added or inserted," mentioning where such word or words are proposed to be added or inserted (if the amendment is of the third kind).

The votes of the members present in the meeting shall then be taken on the amendment by a show of hands.

29A. After a motion or amendment thereto has been moved and seconded, a motion 'That the question be now put' may be moved at any time as a distinct question but not as an amendment, nor so as to interrupt a speech.

29B. After a member has moved 'That the question be now put' the motion 'That the question be now put' shall be put to the vote forthwith and decided without amendment or debate, unless it shall appear to the Chairman that such a motion is an infringement of the rights of reasonable debate.

29C. When the motion 'That the question be now put' has been carried, the motion or amendment, the debate on which has thus been terminated, shall be put and decided without amendment or further debate.

30. If an amendment is negatived, the original motion shall be again stated from the Chair, and subject to the foregoing Regulations, any other amendment which is in order may then be proposed thereto.

31. If an amendment is carried, the motion as amended shall be stated from the Chair, and may then be debated as a substantive question, to which the further amendments to the original motion which are in order and so far as they shall be applicable may be proposed, subject to the foregoing Regulations, and such further amendments shall be disposed of in the same manner as the original amendment.

### (iii) *Adjournments*

32. A motion "That this meeting be now dissolved" or "That this meeting be now adjourned to (some specified date and hour)" may be moved at any time as a distinct question, but not as an amendment, nor so as to interrupt a speech. If a motion for dissolution is carried, the business before the meeting shall drop. If a motion for adjournment is carried, the meeting shall be adjourned, and the business shall be resumed at the adjourned meeting.

33. A motion "That the debate be now adjourned to (some specified date and hour)" may be moved in the like manner, and if it be carried shall have the effect of postponing the debate on the question under consideration till the date and hour specified and the other items on the agenda paper shall be proceeded with. If the motion be negatived, the debate shall be resumed.

34. No amendment shall be moved to a motion under either of the two last preceding Regulations, except one for substituting a different date and hour for that to which it is proposed to adjourn the meeting or debate, or a motion under Regulation 36.

35. A meeting or a debate renewed or continued after an adjournment is to be deemed one with that preceding the adjournment.

36. A motion "That the meeting pass to the next business on the agenda paper" may be made at any time, in like manner and subject to the same rules as one for adjournment. If such a motion be carried, the motion under consideration and the amendments thereon, if any, shall drop.

37. No motion for the dissolution or for the adjournment of the meeting, or for the adjournment of the debate, or to pass to the next business, shall, except by leave of the meeting, be moved or seconded by any Fellow who has spoken to the question then before the meeting, or who, during the discussion



of such question, has already made one of the aforesaid motions. Any such motion shall take precedence of any question that may be before the meeting, and, if not withdrawn, must be disposed of before such question.

38. When a motion of the class contemplated in the last preceding Regulation has been brought forward and negatived, no other motion of that class shall be brought forward until after the lapse of what the Chairman shall deem a reasonable time; nor shall a debate be allowed on such second or subsequent motion except with the permission of the Chairman.

*(iv) Miscellaneous*

39. The Fellow, who first rises to speak at the conclusion of a speech, has the right to be heard. When two or more Fellows rise to speak at the same time, the Chairman shall decide who shall speak first.

40. Except as hereinafter provided, a Fellow, who has spoken to a motion or amendment, is not at liberty to speak again to such motion or amendment.

41. In so far as the question raised by an amendment is one on which he has not yet spoken, any Fellow may speak to that question, though he has spoken to the original question or a previous amendment.

42. No Fellow, except with the permission of the meeting, shall speak for more than fifteen minutes when proposing a motion or amendment, or for more than ten minutes when seconding or speaking to a motion or amendment, or when replying.

43. It shall be open to the Senate under special circumstances and by a special vote to reduce the time limits specified in Regulation 42.

44. The Chairman may, at any stage in the proceedings, at his own discretion or at the request of a Fellow, explain the scope and effect of the motion or amendment which is before the meeting. He may also at the conclusion of a debate, sum up the debate if he so desires.

45. Proposals relating to the conferring of Honorary Degrees, Votes of Thanks, Messages of Congratulation or Condolence, Addresses, and other matters of a like nature, may be moved from the chair.

46. If the Chairman desires to take an active part in a debate he shall vacate the chair until the vote on that debate shall have been taken. During such time the chair shall be taken by the Senior Fellow present who has not already taken

part in the debate and who waives his right to do so. The acting Chairman shall during the debate in question exercise all the ordinary rights of the Chairman.

47. Any Fellow may, with the permission of the Chairman, rise even while another is speaking, to explain any expression used by himself which may have been misunderstood by the speaker, but he shall confine himself strictly to such explanation.

48. Any Fellow may call the Chairman's attention to a point of order even while another Fellow is addressing the meeting, but no speech shall be made on such point of order.

49. The Chairman shall be the sole judge on any point of order, and may call any Fellow to order, and may, if necessary, dissolve the meeting.

50. No motion or amendment shall be withdrawn from the decision of the meeting without its unanimous consent, but the consent shall be presumed if the mover states his wish to withdraw the motion or amendment, and the Chairman, after an interval during which no dissent is expressed, announces that it is withdrawn.

51. Any motion or amendment, standing in the name of a member who is absent from a meeting, or who declines to move it, may be brought forward by any other member.

#### *(v) Voting*

52. On putting any question to the vote, the Chairman shall call for an indication of the opinion of the Senate by a show of hands in the affirmative and negative, and shall declare the result thereof according to his opinion.

53. Any six Fellows may then demand a division, except on a motion of the kind contemplated in Regulations 29A, 32, 33, and 36.

54. The Chairman shall thereupon give such directions for effecting the division as he shall consider expedient. The names of the gentlemen who vote for or against the motion, or decline to vote, shall be recorded.

55. If no division is demanded, any Fellow shall have the right to dissent and to have the fact of his dissent recorded, provided such dissent be announced as soon as the Chairman shall have declared the result of the voting.

#### COMMITTEES

56. The Senate may, when it thinks fit, appoint a committee consisting of any number of its members, or it may

resolve itself into a committee for the consideration of business duly brought before it.

57. A motion for the appointment of a committee, or for the resolution of the meeting into a committee, may be made by any member at any time, and without the notice required by Regulation 5.

58. A motion for the appointment of a committee must define the purpose for which the committee is to serve and the number of members to compose it. Amendments for enlarging or restricting the operations of a committee or for enlarging or restricting the number, may be made without previous notice. If the motion is carried, the member moving shall name the persons whom he wishes to form the committee. Amendments may be made proposing other names. A ballot shall then be taken, if necessary, and the requisite number appointed from those who obtain the largest number of votes.

59. The quorum for a committee of the whole Senate shall be the same as that provided for the meetings of the Senate; the quorum for a committee appointed by the Senate shall be determined at the time of appointment and shall be not less than a majority of the members appointed.

60. The Chairman of a committee of the whole Senate shall be the same as for a meeting of the Senate; the Chairman of a committee appointed by the Senate shall be appointed by the Senate at the time of the appointment of the committee.

In committee the proceedings shall be governed by the Regulations framed for debate, which, however, may be relaxed at the discretion of the Chairman.

61. The resolutions passed by the Senate in committee shall be embodied in a report prepared by the Registrar and signed by the Chairman, but shall not become final until they have been confirmed by the Senate at a subsequent meeting.

62. The resolutions of a committee appointed by the Senate shall be embodied in a report prepared by the Registrar or by a member of the committee, which report shall be laid before the committee for adoption or amendment. The report duly signed by the members of the committee, with notes of dissent, if any, shall be presented to the Senate at its next meeting, subject to the provisions of Regulation 5 respecting notice.

## ELECTIONS

63. In all cases of election, other than those specially provided for, the candidates shall be proposed and seconded. If no more candidates are nominated than there are vacancies to be

filled, the Chairman shall declare those candidates to be elected. If the number of candidates exceeds the number of vacancies, a vote shall be taken by ballot.

64. In the case of a single appointment, a ballot shall be taken, in which each Fellow shall only be entitled to give one vote, and the candidate or candidates receiving the smallest number of votes shall be withdrawn. Another ballot between the remaining candidates shall then be taken, and this procedure shall continue until the number of candidates is reduced to two. There shall then be a final ballot, and the candidate receiving the higher number of votes shall be considered to be duly elected: Provided that if at any stage of the ballot a candidate obtains an absolute majority of votes, the ballot shall cease.

If in any ballot, owing to an equality of votes, all the candidates but one would be eliminated by this procedure, a fresh ballot shall be taken, and if a similar equality again occurs, the Chairman shall give a casting vote.

If in any ballot there is an equality of votes among all the candidates, a fresh ballot shall be taken. If the equality be not removed, the Chairman shall give a casting vote, and the candidate receiving this vote shall be regarded as duly elected; with this exception, it shall be a necessary and sufficient condition for election that a candidate obtains an absolute majority of votes: and should this occur at any stage, the ballot shall cease.

65. In all cases of contested election for two or more appointments, each Fellow shall be entitled to give as many votes as there are appointments to be filled, but shall not give more than one vote for one person. The candidates who obtain the largest number of votes shall be elected, except when by reason of equality of votes the number of such candidates is in excess of the number of appointments to be filled; in this case a fresh ballot shall be taken among those whose equality of votes has caused such excess. If the result of this ballot leaves the matter still undecided as to one or more of the appointments, the Chairman may decide who among the candidates found equal on the second ballot shall be appointed, or the Chairman may, at his discretion, give such directions for further ballot as the circumstances of the case may justify.

#### PROTESTS

66. Any member of the Senate intending to protest against a resolution of the Senate shall give notice of his intention to the Registrar within a week from the date of the issue of the minutes of the meeting at which the Resolution was passed, and within one week thereafter lodge his protest with the Registrar.

The Registrar shall thereupon forward the protest to the Chairman of the meeting and request him to nominate three Fellows to form a committee to prepare a Memorandum in support of the Resolution and the committee so nominated shall frame the Memorandum accordingly. The Registrar shall then cause the protest and Memorandum to be printed and circulated to each member of the Senate; they shall also be laid on the table at the next meeting of the Senate, and recorded in the Minutes thereof.

If the protest relates to a matter, the final decision of which rests with the Chancellor or with the Local Government of Bengal, the Registrar shall further submit the protest and Memorandum, together with a copy of the Resolution, to the Chancellor or to the Local Government of Bengal, as the case may be, for his consideration and orders.

If a protest has been lodged with the Registrar with reference to a Resolution which requires the confirmation of the Chancellor or of the Local Government of Bengal, the Resolution shall not be sent up for confirmation except with the Protest and the Memorandum.

#### RECONSIDERATION

67. No matter which has been decided by the Senate shall, within a period of twelve months, be reconsidered, except—

At a special meeting of the Senate convened for the purpose upon the requisition of six Fellows.

And unless three-fourths of the members present at such meeting vote in favour of a reconsideration.

#### MINUTES

68. Within two weeks after a meeting of the Senate, a draft of the Minutes of such meeting shall be submitted to the Chairman and attested by him. The Minutes shall then be printed and circulated to all members of the Senate, and such of them as were present shall, within a fortnight of the issue of the Minutes, communicate to the Registrar any exceptions they may take to the correctness thereof. The Minutes and the exceptions taken, if any, shall be laid before the next meeting of the Senate, and the Minutes in their final form shall then be confirmed. Once every twelve months, or at such other intervals as the Senate shall direct, the Syndicate shall cause the Minutes of the meetings of the Senate to be printed, and a copy thereof to be forwarded to each Fellow.

## GENERAL

69. In any case not provided for by these Regulations, the Chairman shall give a ruling as to procedure on the principles already laid down.

70. Representatives of the Press and visitors may be admitted to meetings of the Senate, provided they have obtained the permission of the Registrar.

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## CHAPTER II

### VACANCIES ON THE SENATE

1. In the first week of December, 1907, 1908, 1909, 1910, on such dates as may be determined by the Vice-Chancellor or the senior Ordinary Fellow, as the case may be, a ballot shall be taken at the Senate House, with a view to determine who among the three classes of Ordinary Fellows mentioned in Act VIII of 1904, Section 12, clause (l) of the Indian Universities Act should retire. The ballot shall be taken by the Registrar in the presence of the Vice-Chancellor or the senior Ordinary Fellow, as the case may be. Every Ordinary Fellow shall be duly informed of the date and hour and may, if he so desires, be present at the ballot. The Registrar shall forthwith intimate to the Chancellor the names of the retiring Fellows so determined.

The transaction of University business, which is neither formal nor urgent shall, as far as practicable, be avoided, till the vacancies thus caused are filled up, or intimation is received that they will not be filled up.

2. A register shall be kept by the Registrar of the date of appointment of every Ordinary Fellow, and of the date when he will cease to be a Fellow, under Section 4, clause (2) of Section 12, clause (n) of the Indian Universities Act. Not less than six weeks before the date of every approaching vacancy in a Fellowship, the Registrar shall intimate the fact to the Chancellor.

3. A register shall be kept of the attendance of every Ordinary Fellow at meetings of the Senate; and whenever it is ascertained that an Ordinary Fellow has not attended any meeting of the Senate, other than a Convocation, during the period of one year, the Registrar shall intimate the fact to the Chancellor with a view to enable him to take action, if he thinks fit, under Section 11, sub-section (2) of the Indian Universities Act.

4. Except as otherwise provided, whenever the Registrar receives information that a vacancy has occurred on the Senate by reason of the retirement of a Fellow under Section III, Act II of 1857, or by death or resignation or from any other cause, he shall forthwith intimate the fact to the Chancellor.

5. Whenever an Ordinary Fellow ceases to be such from any cause whatever, he shall vacate any University office or appointment held by him in his character as an Ordinary Fellow; and if he is re-elected or re-appointed a Fellow, he shall not again hold such office or appointment unless he is duly appointed thereto.

The same principle shall apply to added members of Faculties

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## CHAPTER III

### THE FACULTIES

1. There shall be five Faculties, namely: (1) Arts, (2) Science, (3) Law, (4) Medicine and (5) Engineering.

A member of the Senate may belong to one or to two of the Faculties, but not to more than two, and need not necessarily belong to any.

2. Appointments to the Faculties shall be made by the Senate at the Annual Meeting. The Syndicate shall, in the first instance, draw up a list of Fellows whom they recommend for appointment to the various Faculties. They shall ordinarily recommend a Fellow for appointment to one Faculty only, but may recommend a Fellow for appointment to two Faculties: Provided that in the latter case Fellows so recommended shall at no time exceed twenty. This list shall be circulated among the members of the Senate by the Registrar not less than sixteen clear days before the meeting. Any member of the Senate may then propose additional names for any of the Faculties, which must be sent to the Registrar nine clear days before the meeting. These names, together with the original list, shall be circulated among the members of the Senate seven clear days before the meeting and no additional names shall be received. The entire list shall be voted on, Faculty by Faculty, and every member shall be declared to be appointed who obtains votes from a majority of the members of the Senate voting for the Faculty under appointment. If any Fellow be appointed to more than two, he must, on receiving intimation, declare to which Faculties he accepts appointment.

3. Between the dates of the Annual Meetings of the Senate the Syndicate shall have power to distribute any newly appointed Fellows to their appropriate Faculties and the Boards of Studies.

4. Each Faculty shall elect its Dean annually from its own number as soon as its members have been appointed.

If any Faculty omits to elect a Dean within one month of the Annual Meeting of the Senate, or if, in the event of the office of Dean being vacated, it fails to elect a new Dean within one month of the occurrence of the vacancy, the Vice-Chancellor may appoint a Dean. The Dean shall always be one of the Fellows belonging to the Faculty.

5. Each Faculty shall have the power to add to its own body a number of Graduates in that Faculty and other persons possessing special knowledge of the subjects of study represented by that Faculty, provided the number of members thus added shall not exceed half the number of Fellows appointed to that Faculty at the Annual Meeting of the Senate and shall in no case exceed ten. A person may belong to more than one Faculty as added member.

6. Such added members shall be elected annually at a special meeting of the Faculty called for the purpose, and the election shall take place in the following manner:—

- (a) The Dean shall as soon as possible after the Annual Meeting of the Senate convene a special meeting for the election of the added members.
- (b) Each Fellow on the Faculty will on receipt of the notice of the meeting be entitled to propose the name of one person for appointment as an added member of the Faculty. Such proposal must be accompanied by a brief written statement of the special qualifications of his nominee, and must reach the Registrar seven clear days before the meeting.
- (c) The Registrar shall cause a list of the nominees and the statements concerning them to be printed and forwarded to the Fellows concerned four clear days before the meeting.
- (d) The voting shall be by ballot, and each Fellow on the Faculty shall be entitled to give one and one vote only for a candidate, but no Fellow shall have more votes than there are appointments to be filled. If the number of nominees does not exceed the limit prescribed by Regulation 5, any candidate, receiving the votes of a majority of the Fellows on the Faculty present at the special meeting (contemplated under the section) and voting shall be held to be duly elected. If the number of nominees exceeds the above limit, those candidates shall be held to be duly elected who have obtained the highest number of votes for the number of appointments admissible, provided that, as before, each such candidate shall have secured the votes of a majority of the Fellows on the Faculty present at the special meeting (contemplated under the section) and voting.

7. All members shall hold office till the next annual appointment of the Faculty by the Senate.

8. Added members shall have the right to take part in the ordinary business of the Faculty and in any election of an Ordinary Fellow by the Faculty, but shall not be entitled to take part in the election of the Syndicate.

Sec. 14 (3).  
Act VIII of 1904,

9. Every meeting of a Faculty shall be convened by the Dean, or in his absence, or when the office of Dean is vacant, by the senior Ordinary Fellow belonging to the Faculty present in Calcutta.

10. The Dean, or in his absence, or when the office of Dean is vacant, the senior Ordinary Fellow, belonging to the Faculty present in Calcutta, shall convene a meeting of the Faculty on the requisition of any three members.

11. Three clear days' notice shall be given of ordinary meetings of the Faculties. In the case of elections of Members of the Syndicate, Fellows, Added Members, and Boards of Studies, fifteen clear days' notice shall be given.

12. The quorum for the Faculty of Arts shall be ten, and for any other Faculty three.

13. Two or more Faculties may be called upon by the Senate or the Syndicate to meet together for the disposal of any questions affecting more than one Faculty. In such cases the joint meeting shall elect its own Chairman.

14. The quorum of a joint Faculty meeting must include a full quorum of each Faculty represented, no member present being counted on more than one separate quorum.

15. It shall be the duty of a Faculty to consider and report on all matters referred to it by the Syndicate or the Senate, and a Faculty shall be at liberty to make recommendations to the Syndicate in all matters relating to the organization of University Examinations, Teaching, and Research in the studies or subjects with which it is concerned, and to propose regulations relating to these matters for the consideration of the Syndicate.

16. All elections shall be conducted in the same manner as those in the Senate, except as otherwise provided.

17. Within two weeks after a meeting of a Faculty, a draft of the Minutes of such meeting shall be submitted to the Chairman and attested by him. The Minutes shall then be printed and circulated to all members of the Faculty, and such of them as were present shall, within a fortnight of the issue of the Minutes, communicate to the Registrar any exception they may take to the correctness thereof. The Minutes and the exceptions taken, if any, shall be laid before the next meeting of the Faculty, and the Minutes in their final form shall then be confirmed. Once every twelve months, or at such other intervals as the Senate shall direct, the Syndicate shall cause the

Minutes of the meetings of each Faculty to be printed and a copy thereof to be forwarded to each member of the Faculty concerned.

18. The rules for debate laid down in the Senate Regulations shall apply to the Faculties as far as is practicable, but the Chairman may relax their operation at his discretion.

19. The Dean shall ordinarily preside at meetings of a Faculty, and in the absence of the Dean the members present shall elect a Chairman.

## CHAPTER IV

### THE SYNDICATE

1. The executive government of the University is vested in the Syndicate, which shall consist of the Vice-Chancellor of the University as Chairman, and the Director of Public Instruction to the Government of Bengal for the time being as *ex-officio* member, and 15 of the *ex-officio* or Ordinary Fellows of the University, who shall be elected for a period of one year, partly by the Senate and partly by the Faculties, as follows:—

Four by the Senate.

Four by the Faculty of Arts.

Two by the Faculty of Science.

Two by the Faculty of Law.

Two by the Faculty of Medicine.

One by the Faculty of Engineering.

The Syndics elected by any Faculty must be Fellows belonging to that Faculty.

2. The election by the Faculties shall take place at special meetings not less than three weeks before the Annual Meeting of the Senate. Notice of such meetings shall be issued by the Registrar, not less than fifteen clear days before the appointed date. Each Fellow on the Faculty will, on receipt of the notice, be entitled to propose the name of one person for appointment as member of the Syndicate. Such proposal must reach the Registrar seven clear days before the meeting. The Registrar shall cause a list of the nominees to be printed and forwarded to the Fellows concerned four clear days before the meeting. In any contested election the voting shall be by ballot and the procedure shall be the same as that laid down in paragraphs 63-65 of the Senate Regulations. As soon as members have been elected by any Faculty, their names shall be notified by the Registrar to all members of the Senate.

3. The election by the Senate shall take place at the Annual Meeting. Not less than seven days before the meeting the names of members who are proposed by any Fellows for election shall be submitted in writing to the Registrar, who shall circulate the names to the members of the Senate at least four clear days before the meeting.

4. Of the fifteen members of the Syndicate so elected at least seven shall be either Heads of, or Professors in, Colleges affiliated to the University, and of these Syndics at least two shall be elected by the Senate and at least five by the various Faculties :—

Three by the Faculty of Arts.  
 One by the Faculty of Science.  
 One by the Faculty of Medicine.

In any meeting for election such Syndics to the stated minimum number shall be elected first.

Fellows qualified for election under this Regulation are not debarred from election to the remaining places on the Syndicate.

*Explanation.*—A person who has been elected to a seat reserved for Heads of, or Professors in, Colleges affiliated to the University, shall, as soon as he ceases to be such Head or Professor, be deemed to have vacated his seat, and the electorate concerned shall proceed to fill up the vacancy by the election of a person possessing the necessary qualification.

5. If in the case of any election of a Fellow to the Syndicate the question is raised whether any person so elected is or is not a Professor within Section 15, sub-section (2) of the Indian Universities Act, the question shall be decided by the Senate.

6. The Syndicate shall meet ordinarily once a month, and at other times when convened by the Vice-Chancellor, or in his absence from Calcutta, or when the office of Vice-Chancellor should happen to be vacant, by the senior member of the Syndicate present in Calcutta. Whenever an emergency arises and there is not time to summon a meeting of the Syndicate, the Vice-Chancellor may take such immediate action as he deems necessary. The nature of the emergency and the action taken to meet it shall be reported by the Registrar at the next meeting of the Syndicate.

7. The Syndicate shall have power to appoint committees from among its own members, and to add to such committees any Ordinary Fellow of the University and any added member of a Faculty. The reports of such committees must be considered by the Syndicate as a whole before being published or acted upon.

8. All members of the Syndicate must ordinarily be resident in or near Calcutta. If any member is temporarily absent from his residence, the Vice-Chancellor or the Dean of his

Faculty, as the case may be, may appoint a member possessing the necessary qualifications to officiate during his absence. Should the period of absence exceed three months, the Vice-Chancellor may declare his place vacant.

9. On every vacancy in the Syndicate caused by death or resignation, or otherwise, the Senate or the Faculty, as the case may be, shall proceed to elect a new member for the remainder of the term for which the original member had been elected.

10. If the Senate or the Faculty omits to elect a member of the Syndicate within one month after a vacancy occurs, the Vice-Chancellor may appoint a person possessing the necessary qualifications.

11. Seven members of the Syndicate shall constitute a quorum, and all questions shall be decided by a majority of the votes of the members present. The Vice-Chancellor, or, in his absence, the senior Fellow present, shall preside at all meetings of the Syndicate, and if the votes, including that of the President, are equally divided, the President shall have a casting vote.

12. It shall be the duty of the Syndicate to consider and report upon matters to be submitted to the Senate; to appoint, and if necessary to remove, the Examiners and all other officers of the University in regard to whom this power is conferred by the Regulations; to make rules for the conduct of examinations in conformity with the Regulations and to fix the time at which they shall be held; to recommend to the Senate the grant of degrees, honours and rewards; to administer the funds and to keep the accounts of the University; to correspond on the business of the University with the Government and all other authorities and persons; and generally, to conduct the affairs of the University in accordance with the Act of Incorporation and the Indian Universities Act, the Regulations, and the Resolutions of the Senate and the Syndicate.

13. The Syndicate may from time to time recommend to the Senate such Regulations as may seem desirable.

14. Each Faculty shall report on any subject that may be referred to it by the Syndicate. Any Faculty, or any member or number of members of the Senate, may make any recommendation to the Syndicate and may propose any Regulation for the consideration of the Syndicate.

15. The decision of the Syndicate on any such recommendation or proposition, or on any matter whatever, may be brought before the Senate by any member of the Senate at one of its meetings, and the Senate may approve, revise, or modify any such decision or may direct the Syndicate to review it: Provided that no matter directly concerning any particular Faculty

shall be disposed by the Syndicate or the Senate without having been referred to that Faculty for opinion.

16. All questions as to affiliation or disaffiliation of Colleges or the continuation of affiliation granted to Colleges or to the courses of instruction which such Colleges will be allowed to adopt for the purposes of University examinations or to the inspection of and report on the condition of Colleges, shall be dealt with by the Syndicate in accordance with Sections 20, 21, 22, 23 and 24 of the Indian Universities Act.

17. All questions as to the recognition of or on the withdrawal of recognition from, or the conditions required for the continuance of recognition of, schools shall be dealt with by the Syndicate under the Regulations prepared under Section 25 (2) (c) of the Indian Universities Act.

18. Whenever practicable, the Syndicate may, with the sanction of the Senate and from the funds of the University or any other funds placed at the disposal of the University for the purpose, institute scholarships for post-graduate study or studentships for research in literary or scientific subjects. The conditions governing their award and tenure shall be laid down from time to time by the Senate.

19. With a view to encourage research in vernacular literatures and languages, and foster their growth, the Syndicate may, with the sanction of the Senate, provide grants, prizes or scholarships for—

- (a) critical editions of early vernacular text;
- (b) historical investigations of the origins of vernacular literatures and their early development;
- (c) philological investigations of Indian vernaculars and their dialects.

20. The Minutes of the Syndicate, having been duly confirmed, shall be printed and circulated at once to the members of the Senate.

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## CHAPTER V

### BOARDS OF STUDIES

1. There shall be Boards of Studies in the following branches of knowledge:—

- (1) English.
- (2) Greek, Latin, French, German and Armenian
- (3) Sanskrit.
- (4) Sanskrit Languages.
- (5) Hebrew.
- (6) Arabic, Persian and Urdu.
- (7) History.
- (8) Economics and Political Philosophy.
- (9) Mental and Moral Philosophy.
- (10) Chemistry.
- (11) Experimental and Mathematical Physics.
- (12) Zoology.
- (13) Geology and Mineralogy.
- (14) Botany.
- (15) Physiology.
- (16) Anthropology.
- (17) Psychology.
- (18) Mathematics.
- (19) Geography.
- (20) Teaching.
- (21) Law.
- (22) Medicine.
- (23) Engineering.

The Boards shall be respectively appointed by the Faculties as follows:—

Boards 1-9 shall be appointed by the Faculty of Arts.

Boards 10-15 shall be appointed by the Faculty of Science.

Board 16-20 shall be appointed by the Faculties of Arts and Science.

Board 21 shall be appointed by the Faculty of Law.

Board 22 shall be appointed by the Faculty of Medicine.

Board 23 shall be appointed by the Faculty of Engineering.

2. The members of a Board shall be teachers of, or examiners in, or other persons who have a special knowledge of the subject or subjects with which the Board is concerned.

3. No fewer than three and not more than twelve members of a Board shall be appointed by the Faculties.

4. The members of the respective Boards, up to a maximum of twelve, shall be appointed by the Faculty or Faculties as provided in Regulation 1 from among their own members (including added members). The different Boards of Studies thus formed shall have the power to co-opt three additional members all of whom must be teachers of, or specialists in, subject or subjects with which the Board is concerned and shall severally hold office for one year from the date of appointment. They shall be eligible for re-appointment. No member shall belong to more than five Boards.

Where a Board as constituted under the above Regulations does not contain at least 33 per cent. of members who are also members of the relevant Board of Higher Studies such a number of members shall be co-opted from the Board of Higher Studies as will bring the percentage as near as possible to 33.

5. The Board of Studies shall be elected annually at a special meeting of the Faculty called for the purpose, and the election shall take place in the following manner:—

- (a) The Dean of each Faculty shall, as soon as possible after the election of the added members, convene a special meeting for the appointment of the Boards.
- (b) Each Member of a Faculty will, on receipt of a notice of the meeting, be entitled to propose not more than twelve members of the same Faculty for appointment to each of the Boards under that Faculty. The list of members proposed by him must reach the Registrar seven clear days before the meeting.
- (c) The Registrar shall cause a list of the nominees to be printed and forwarded to the Fellows concerned, four clear days before the meeting.
- (d) In any contested election the voting shall be by ballot and the procedure laid down in the Senate Regulations 63-65 shall be followed.

6. Where two or more Faculties have to appoint a Board they shall appoint the members thereof in the proportion assigned to them by the Syndicate previous to such appointment.

7. Each Board shall elect its own President. Every meeting of a Board shall be convened by its President or, in his absence, by the senior Fellow belonging to that Board. Three members shall constitute a quorum. The President of a Board,

or, in his absence, the senior Fellow belonging to the Board, shall convene a special meeting of the Board on the requisition of two or more members of the Board.

8. The duties of each Board shall be—

- (i) to recommend to the Syndicate courses of study for the various examinations of the University in the subject with which the Board is concerned;
- (ii) to recommend to the Syndicate, for the guidance of teachers and students, books in which the prescribed subjects are suitably treated; and to recommend text-books when such are required: Provided that no book or text-book shall be recommended by a Board unless on the written report of some competent person who has read it, which report shall be forwarded to the Syndicate;
- (iii) to consider at the request of the Syndicate, the reports of the Examiners in the subjects with which the Board is concerned, and to frame such recommendations regarding methods of teaching, study and examination as may seem necessary in the interests of education;
- (iv) to furnish the Syndicate with the names of persons competent to act as Examiners in the subjects with which the Board is concerned; and
- (v) to consider and report upon all such matters as may be referred to it by the Syndicate, the Faculties by which its members are appointed, or the Senate.

9. Two or more Boards may be called upon by the Syndicate or the Senate to meet together for the disposal of any questions affecting more than one Board. In such cases the joint meeting shall elect its own President. The quorum of a joint Board meeting must include a full quorum of each Board represented, no member present being counted on more than one separate quorum.

10. All meetings of the Boards shall be convened through the Registrar, who will keep a record of the proceedings of the meeting.

11. Meetings of Boards shall be presided over by the President of the Board; in the absence of the President, the members present shall elect a Chairman.

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## CHAPTER VI

### UNIVERSITY FINANCE COMMITTEE

A University Finance Committee shall be appointed annually to deal with the finances of the University in all its departments, consisting of the following members:—

- (1) The Vice-Chancellor.
- (2) The Director of Public Instruction, Bengal, or a representative of the Education Department of the Government of Bengal to be nominated for the year by the Syndicate after consultation with the Director of Public Instruction, Bengal.
- (3) The President, Council of Post-Graduate Teaching in Arts, or a representative of the Council to be nominated by the Executive Committee.
- (4) The President, Council of Post-Graduate Teaching in Science, or a representative of the Council to be nominated by the Executive Committee.
- (5) One representative to be nominated by the Syndicate.
- (6) One representative to be nominated by the Governing Body of the University Law College.
- (7) & (8) Two representatives to be nominated by the Senate.
- (9) The Director of Public Instruction, Assam, or a representative of the Education Department of the Government of Assam, to be nominated for the year by the Syndicate after consultation with the Director of Public Instruction, Assam.

If the same person holds more than one office under (1), (3) and (4) above, the Senate shall give necessary directions for appointment of a substitute member or members.

The Committee shall co-opt a member representing the Governing Bodies or Boards of Management of the Trust Funds of the University.

The Vice-Chancellor shall be the President of the Committee. The Committee shall also elect annually a Vice-President. The Committee shall appoint its own Secretary. Five members shall constitute a quorum.

The duties of the Committee shall be to prepare in its final form the consolidated Budget Estimates of the University in all its departments. In preparing the consolidated Budget Estimates the Committee shall consider the proposals from various departments including the Budget Estimates prepared by the Post-Graduate Finance Committee for the Teaching Depart-

ments and the Budget Estimates of the University Law College prepared by the Governing Body as approved by the Syndicate. The consolidated Budget so prepared shall be submitted by the Committee to the Senate through the Syndicate for adoption.

All proposals involving new expenditure during the year (not covered by Budget grants) shall be placed before the Committee for scrutiny. Such scrutiny by the Committee shall involve consideration of the merits of the said proposals as well as their financial implications. The Committee shall then make its recommendations to the Senate or any other relevant authority. No action will be taken in respect of such proposals by the bodies concerned (except in cases of emergency) until they have been finally sanctioned.

The Committee shall arrange for examination and audit of the University accounts and the accounts of the Endowments and Trust Funds, and shall maintain a watch over the progress of income and expenditure provided for in the Budget.

The Committee shall report upon any matter which may be referred to it by the competent authority for opinion.

The Committee shall frame rules from time to time which shall be subject to sanction of the Senate.

The proceedings of the University Finance Committee shall be subject to confirmation by the Syndicate. In case of difference of opinion the Syndicate shall refer the matter to the Senate for decision.

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## CHAPTER VII

### THE REGISTRAR AND OTHER UNIVERSITY OFFICERS

1. The Registrar shall be appointed by the Senate and only at an Annual Meeting. He shall be appointed for five years only or for such shorter term as the Senate may, for special reasons, determine but at the end of every such term he may be re-appointed. The term of office of the Registrar shall commence on the first day of April next following his election: Provided that the first appointment shall be made within six months after these Regulations come into effect. If a vacancy occurs in the office of the Registrar between two Annual Meetings of the Senate, the Syndicate shall appoint a person to officiate until the first day of April following the next Annual Meeting.

2. The Registrar shall be a graduate of position with experience of University affairs. He shall be a whole-time officer. He may be a member of the Senate, but shall not be a member of the Syndicate. His salary shall be Rs. 800 per mensem, rising to Rs. 1,000 in five years by four annual increments of Rs. 50.

3. The duties of the Registrar shall be as follows:—

- (a) To be custodian of the Records, Library, Common Seal, and such other property of the University as the Syndicate shall commit to his charge.
- (b) To act as Secretary to the Syndicate and to attend all meetings of the Senate, Faculties, Syndicate, Boards of Studies, Boards of Examiners, and any Committees appointed by the Senate, the Faculties, the Syndicate, or any of the Boards, and to keep Minutes thereof.
- (c) To conduct the official correspondence of the Syndicate and the Senate.
- (d) To issue all notices convening meetings of the Senate, Faculties, Syndicate, Boards of Studies, University Finance Committee, Boards of Examiners, and any Committees appointed by the Senate, the Faculties, the Syndicate, or any of the Boards.

- (e) To perform such other work as may be, from time to time, prescribed by the Syndicate, and generally to render such assistance as may be desired by the Vice-Chancellor in the performance of his official duties.

4. Under the Registrar there may be the following branch officers:—

- (1) The Controller of Examinations.
- (2) The Assistant Registrar.
- (3) The Assistant Controller of Examinations.
- (4) The Audit Officer.

#### THE CONTROLLER OF EXAMINATIONS

(i) The Controller of Examinations shall be appointed by the Senate and only at an Annual Meeting. He shall be appointed for five years or for such shorter term as the Senate may, for special reasons, determine but at the end of every such term he may be re-appointed. His salary shall be fixed by the Senate. The term of office of the Controller of Examinations shall commence on the first day of April next following his election. If a vacancy occurs in the office of the Controller of Examinations between two Annual Meetings of the Senate, the Syndicate shall appoint a person to officiate until the first day of April following the next Annual Meeting.

(ii) The Controller of Examinations shall be a graduate of position with experience of University affairs. He shall be a whole-time officer.

(iii) He shall be responsible for the custody of question papers and shall discharge such other duties as are laid down in rules that may be adopted by the Senate, and perform such other work as may be, from time to time, prescribed by the Syndicate.

(iv) The Assistant Controller of Examinations, who shall be a graduate, shall be appointed by the Syndicate on a scale of pay sanctioned by the Senate. His immediate official superior will be the Controller of Examinations.

#### THE ASSISTANT REGISTRAR

The Assistant Registrar, who shall be a graduate, shall be appointed by the Syndicate on a scale of pay sanctioned by the Senate.

#### THE AUDIT OFFICER

The Audit Officer, who should have adequate training and experience as an auditor, shall discharge such duties as the

Senate may, from time to time, assign to him. He shall be appointed by the Senate on the recommendation of the Syndicate on a scale of pay sanctioned by the Senate. In making the recommendation the Syndicate shall consult the University Finance Committee.

#### THE SECRETARY TO THE POST-GRADUATE DEPARTMENT

5. There shall be a salaried and whole-time Secretary to the Councils of Post-Graduate Teaching in Arts and Science and their Executive Committees. He shall discharge such duties as the Executive Committees may decide. He shall be appointed by the amalgamated Councils of Post-Graduate Studies subject to confirmation by the Senate. Until the Post-Graduate Councils are amalgamated he shall be appointed at a joint meeting of the two Executive Committees subject to confirmation by the Senate.

#### GENERAL

6. There shall be a permanent ministerial staff and a permanent staff of servants who shall be appointed according to rules to be laid down by the Senate from time to time and whose number and scale of pay shall be determined by the Syndicate or the Executive authority concerned.

7. It shall be competent to the Syndicate or the Executive authority concerned, to grant, after report from the Audit Officer, to the Registrar and other officers of the University and to the ministerial staff and servants, such leave as may be admissible to them under the rules framed by the Senate from time to time.

8. It shall be competent to the Syndicate or the Executive authority concerned, subject to such modifications as may be rendered necessary by the institution of the Provident Fund, to grant to the Registrar and other Officers of the University and to the subordinate staff and servants a gratuity or pension regulated as follows:—

(a) After a service of less than ten years, a gratuity not exceeding one month's salary for each completed year of service.

(b) After a service of not less than ten years, up to 25 years, a pension not exceeding one-sixtieth of the average salary (*i.e.*, the average calculated upon the last three years of service) multiplied by the number of years of completed service.

The pension shall in no case exceed Rs. 5,000 per annum.

9. In case of misconduct or neglect of duty, the Registrar and other University Officers, *i.e.*, the Controller of Examina-



tions, the Assistant Registrar, the Audit Officer, the Secretary, Councils of Post-Graduate Teaching in Arts and Science, the Assistant Contoller of Examinations, shall be liable to suspension by the Syndicate or the Executive Body concerned and to dismissal by the Senate, on the report of that body.

All the other members of the Office staff and servants shall be liable to suspension and to dismissal by the Syndicate or the Executive Body concerned, in case of misconduct or neglect of duty.

10. Officers and Assistants shall ordinarily retire at the age of 55. The appointing body may by a special resolution, where it is in the interests of the University, allow an Officer or an Assistant an extension of service of one year at a time up to his 60th year. In no case should an Officer or Assistant be allowed to remain in service after he is 60 years of age.

11. It shall be competent to the Senate to grant a special allowance to any of the University Officers on any special grounds.

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## CHAPTER VIII

### INSPECTOR OF COLLEGES

1. For the purpose of inspecting affiliated Colleges a salaried Inspector shall be appointed. The appointment shall be made by the Senate and only at an Annual Meeting, and shall be subject to the approval of Government. He shall be appointed in the first instance for ten years, but at the end of every such term he may be re-appointed. If a vacancy occurs in the office of Inspector, the Syndicate shall appoint a person to officiate until the next Annual Meeting of the Senate.

2. The Inspector of Colleges shall be a person of high academic standing and one possessing some experience of Indian Colleges. He shall be a whole-time Officer of the University. His leave, gratuity or pension shall be on the same terms and conditions as those of the Registrar. His scale of pay shall be Rs. 750-50/2-1,000. He may be a Fellow of the University but must not be a member of the Syndicate. The duties of the Inspector of Colleges shall be—

- (a) to report on Colleges applying for affiliation;
  - (b) to inspect affiliated Colleges; and
  - (c) to inspect such schools as may from time to time be indicated by the Syndicate.
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## CHAPTER IX

### UNIVERSITY PROFESSORS

1. When the funds of the University permit, the Senate with the previous consent of Government shall found such Professorships as it may think fit, prescribe the conditions on which they shall be tenable, and provide in connection therewith lecture-rooms, libraries, museums, laboratories, workshops and other facilities for teaching and research.

2. The Senate shall likewise found and endow Professorships on particular subjects, from funds specially given or bequeathed for the endowment of such Professorship or, if it thinks fit, accept endowments of such Professorships, made by individual or corporate donors.

3. The Senate shall appoint and shall, subject to the conditions annexed to the tenure of any Professorship, have power to remove the Professors of the University. The Senate shall in the same manner appoint Assistant Professors, prescribe their duties and remuneration, and have power to dismiss them if necessary.

4. Demonstrators and other Assistants shall from time to time be assigned to Professors and Assistant Professors, subject to such conditions with regard to manner of appointment, tenure of office, duties and remuneration as shall be prescribed by the Senate.

5. The Senate shall from time to time make rules fixing the fees, if any, to be paid by the students attending the classes of Professors and Assistant Professors, and the money thus collected in fees shall be the property of the University.

6. Professors and Assistant Professors shall lecture or otherwise teach in such places as shall be from time to time determined by the Senate.

7. The Senate shall make rules for the retirement of, as well as the grant of bonuses and pensions to Professors, Assistant Professors, Demonstrators and other Assistants.

8. In appointing a Professor or Assistant Professor of the University the Senate shall specify the subject, that is to say, the branch or branches of knowledge for which he is appointed. He shall be authorised to lecture only in the subject or subjects indicated.

9. Endowed Professorships already accepted by the Senate shall, subject to the conditions of the endowment, be governed by these Regulations.

10. No University Professor shall be appointed without the sanction of Government.

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## CHAPTER X

### SPECIAL UNIVERSITY READERS

1. A certain sum, whenever practicable, shall be set apart annually from the University income or from any funds specially provided for the purpose by Government or other donors, for the purpose of providing special courses of lectures on particular subjects. These lectures shall be delivered generally during the cold weather months, and will be intended mainly for the benefit of graduates engaged in research work or of those who wish to prosecute special studies. The lecturers delivering such courses of lectures shall be called Special University Readers.

2. The appointment of a Special University Reader in any subject shall be made by the Senate on the recommendation of the Syndicate.

3. Special University Readers shall lecture in such places as may be from time to time determined by the Senate.

4. The fee for a course of lectures under Section 1 shall from time to time be fixed by the Syndicate, and the money thus collected in fees shall be the property of the University.

5. A Special University Reader appointed under Section 1 shall ordinarily receive a honorarium of Rs. 2,000 for a course of lectures, but in special cases this fee may be increased.

6. The Senate on the recommendation of the Syndicate shall from time to time allot funds to meet the remuneration of Demonstrators and Assistants as well as any general expenditure which may be incurred in connection with these lectures.

7. Courses of lectures delivered under Section 1 shall be printed and published at the expense of the University.

8. No Special University Reader shall be appointed without the sanction of Government.

## CHAPTER XI

### UNIVERSITY TEACHERS

1. The University shall provide for Post-Graduate Teaching, Study and Research in the Faculties of Arts and Science.

*Explanation.*—The term " Post-Graduate " as used in this Chapter has reference only to the examinations for the degrees of Master of Arts and Master of Science (Chapters XXXIII and XXXVII).

#### Part I

#### Post-Graduate Teaching in Calcutta

2. Post-Graduate Teaching in Calcutta shall be conducted only in the name and under the control of the University; for this purpose two Councils shall be constituted, namely, the Council of Post-Graduate Teaching in Arts, and the Council of Post-Graduate Teaching in Science.

3. The staff for Post-Graduate Teaching in Calcutta will consist of (a) teachers appointed and paid by the University; (b) teachers whose services are, on the application of the University, lent from time to time by the local or Imperial Government or by a private institution and who during the time they work under the University are University officers; (c) teachers in Colleges whose attainments specially qualify them for Post-Graduate instruction and who undertake, at the request of the University and for a remuneration decided on by it, to deliver a course of lectures on selected topics; teachers in Colleges whose attainments specially qualify them for Post-Graduate work, and who shall be recognised by the University as Extra-Mural Lecturers; (d) persons engaged in other than educational work who undertake, at the request of the University and for a remuneration decided on by it, to deal with special subjects in which they are authorities.

Extra-Mural Lecturers shall be recommended annually by their Colleges for recognition by the University. Such recommendations, along with a statement, showing at the time of the first recognition, their qualifications, and outlining the proposed course of lectures for the ensuing session, shall reach the University not later than February 15th in each year. Such proposals shall be placed before the Board of Higher Studies and the Executive Committee concerned, the selection to be finally made by the Senate. Lecturers thus recognised by the University shall undertake to deliver in their own Colleges a minimum

of twenty lectures in each session and such lectures shall be open both to the Post-Graduate students of the College concerned and to such other Post-Graduate students as desire to attend. Attendance at such lectures shall not be obligatory but shall be reckoned as alternative to not more than twenty per cent. of the total number of lectures delivered by the University Teachers appointed under Section 3 (a), (b), (c) and (d) and to this extent shall be regarded as constituting part of the regular course of study qualifying for admission to the M.A. or M.Sc. Examination. The question of remuneration of such lecturer and tuition fees to be paid by students who attend such lectures shall be settled by the Executive Committee in consultation with the Colleges.

#### POST-GRADUATE TEACHING IN ARTS

4. The Council of Post-Graduate Teaching in Arts in Calcutta shall be composed as follows:—

(a) All persons appointed teachers for Post-Graduate instruction in Arts, under Section 3; such teachers will be members *ex-officio* :

(b) Four members annually appointed by the Senate :

(c) Two members annually appointed by the Faculty of Arts :

(d) Heads of all Colleges in Calcutta affiliated to the B.A. standard :

Provided that, for the purpose of the constitution of the first Council, under these Regulations, the persons mentioned in clause (a) shall be deemed to include all teachers, who, on the date of commencement of these Regulations, are engaged either under the University or in an affiliated College in Calcutta, in Post-Graduate work in Arts.

*Explanation.* --No person shall be deemed to be a " teacher " within the meaning of clause (a) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of the staff is a " teacher " for the purpose of this rule, the matter shall be referred to the Senate for decision.

5. The Council of Post-Graduate Teaching in Arts shall annually elect its own President.

6. As soon as possible, after the constitution of the Council, an Executive Committee thereof shall be annually formed as follows:—

(1) President of the Council, *Chairman*.

(2) Vice-Chancellor.

(3) Heads of Departments within the jurisdiction of the Council.

(4) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or Teacher of an affiliated College.

- (5) One representative of the Syndicate.
- (6) One representative of the relevant Faculty.
- (7) Fifteen members to be elected by the Post-Graduate Council concerned, of whom at least three shall be part-time Lecturers and at least four shall be University Professors other than Heads of Departments:

Provided in the case of whole-time Lecturers not more than one shall be from any one Department; provided also that in the case of part-time Lecturers not more than one representative shall be from any one College.

7. The Boards of Higher Studies shall be constituted annually in each of the following subjects, as soon as possible after the constitution of the Council:—

- (i) English.
- (ii) Sanskrit.
- (iii) Pali.
- (iv) Arabic and Persian.
- (v) Hebrew and Syriac.
- (vi) Modern Indian Language.
- (vii) Comparative Philology.
- (viii) Mental and Moral Philosophy.
- (ix) Psychology.
- (x) History.
- (xi) Ancient Indian History and Culture.
- (xii) Islamic History and Culture.
- (xiii) Political Economy and Political Philosophy.
- (xiv) Commerce.
- (xv) Pure Mathematics.
- (xvi) Anthropology.
- (xvii) Latin.

8. The Board of Higher Studies in each subject or group of subjects shall consist of—

(a) Teachers of that subject or group of subjects appointed under Section 3; such teachers shall be members *ex-officio*.

(b) Three persons selected by the Council from amongst its members.

(c) Not more than two members co-opted by the persons mentioned in clauses (a) and (b) from amongst those engaged in Post-Graduate teaching in the subject concerned in places outside Calcutta:

Provided that in the case of the Board of Higher Studies in Islamic History and Culture, for the first three years after the institution of the course of studies in Islamic History and Culture in the University, five experts are to be appointed by the Senate on the recommendation of the Executive Committee of



the Council of Post-Graduate Teaching in Arts. The temporary vacancies in the places of the experts shall be filled up by the Executive Committee.

Where a Board of Higher Studies as constituted above does not contain at least 33 per cent. of members who are also members of the relevant ordinary Board, such a number of members shall be co-opted from the ordinary Board as will bring the percentage as near as possible to 33.

9. The Senate on the recommendation of the relevant Executive Committee, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows:

(1) Where there is only one Professor in any Department, the Executive Committee shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.

(2) In the case of a Department where clause (1) is not applicable or the relevant Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the relevant Executive Committee.

(3) The Head shall be appointed for five years but he will be eligible for re-appointment:

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary:

(4) Where the Executive Committee considers it desirable, it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the relevant Executive Committee, for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of a Department and a teacher of the Department regarding the arrangement of the

time-table and distribution of work shall be decided by the Executive Committee concerned.

(d) He shall be responsible for the proper expenditure of money allocated to the Department and for ensuring that a proper account is kept of the appliances, apparatus, etc., in the Department.

“ Proper ” here includes “ in accordance with the procedure decided by competent authority.”

(e) He shall ensure, in consultation with the other teachers, that the students receive such advice and guidance as they may require, with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereafter in Sections 38 and 39.

(f) He will perform such other duties as have been or may be entrusted to him by the Senate.

10. The Council mentioned in Section 4 is vested with authority, subject to the ultimate control of the Senate (communicated by the Syndicate), to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Arts in Calcutta.

The Executive Committee of the Council will receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations, and will exercise such supervision and give such direction as may be necessary to ensure regularity of work and maintenance of discipline among the students.

Subject to the provisions of Section 22 hereinafter, the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever necessary. But if the proposed arrangements involve whenever financial commitments, the Executive Committee shall refer the matter in the first instance to the Post-Graduate Finance Committee, and shall place its recommendation before the Senate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

11. The Board of Higher Studies in each subject shall, for purposes of Post-Graduate teaching and Post-Graduate examination, make proposals regarding—

- (a) courses of study;
- (b) text-books or recommended books;
- (c) standards and conduct of examinations;

(d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff;

(e) appointment of examiners; and

(f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Boards of Higher Studies shall be subject to confirmation, revision or modification by the Executive Committee which shall also have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have the power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary, and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review its decision on any matter.

12. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon examine the said requirements and formulate the consolidated demands of all departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee.

#### POST-GRADUATE TEACHING IN SCIENCE

13. The Council of Post-Graduate Teaching in Science in Calcutta shall be composed as follows:—

(a) All persons appointed teachers for Post-Graduate instruction in Science, under Section 3; such teachers shall be members *ex-officio* :

(b) Four members annually appointed by the Senate :

(c) Two members annually appointed by the Faculty of Science :

(d) Heads of all Colleges in Calcutta affiliated to the B.Sc. standard :

Provided that, for the purpose of the constitution of the first Council, under these Regulations, the persons mentioned in clause (a) shall be deemed to include all teachers, who, on the date of commencement of these Regulations, are engaged, either under the University or in an affiliated College in Calcutta, in Post-Graduate work in Science.

*Explanation.*—No person shall be deemed to be a " teacher " within the meaning of clause (a) of this section unless he performs independent teaching work in the Post-Graduate classes. If a question arises as to whether a member of the staff is a " teacher " for the purpose of this rule, the matter shall be referred to the Senate for decision.

14. The Council of Post-Graduate Teaching in Science shall annually elect its own President.

15. As soon as possible after the constitution of the Council, an Executive Committee thereof shall be annually formed as follows :—

- (1) President of the Council, *Chairman*.
- (2) Vice-Chancellor.
- (3) Heads of Departments within the jurisdiction of the Council.
- (4) Two representatives of the Senate elected by the Senate, of whom at least one shall be a Principal or Teacher of an affiliated College.

- (5) One representative of the Syndicate.
- (6) One representative of the relevant Faculty.
- (7) Fifteen members to be elected by the Post-Graduate Council concerned, of whom at least three shall be part-time Lecturers and at least four shall be University Professors other than Heads of Departments :

Provided in the case of whole-time Lecturers not more than one shall be from any one Department; provided also that in the case of part-time Lecturers not more than one representative shall be from any one College.

- (8) One representative of each of the three Trust Funds of the University, viz., Governing Body of the Sir Taraknath Palit Trusts, Board of Management of the Sir Rashbehary Ghose Endowments and Board of Management of the Khaira Fund.

16. The Boards of Higher Studies shall be constituted annually in each of the following subjects, as soon as possible, after the constitution of the Council :—

- (i) Applied Mathematics.
- (ii) Pure Physics.
- (iii) Pure Chemistry
- (iv) Botany.

- (v) Physiology.
- (vi) Geology.
- (vii) Zoology.
- (viii) Applied Physics.
- (ix) Applied Chemistry.
- (x) Statistics.
- (xi) Geography.

*Note.*—Should arrangements be made at any time for instruction by the University in any branch of Science other than those mentioned above, a Board of Higher Studies in each such subject shall forthwith be constituted.

17. The Board of Higher Studies in each subject or group of subjects shall consist of—

(a) Teachers of that subject or group of subjects appointed under Section 3; such teachers shall be members *ex-officio*.

(b) Three persons elected by the Council from amongst its members.

(c) Not more than two members co-opted by the persons mentioned in clauses (a) and (b) from amongst those engaged in Post-Graduate teaching in the subject concerned in places outside Calcutta.

Where a Board of Higher Studies as constituted above does not contain at least 33 per cent. of members who are also members of the relevant ordinary Board, such a number of members shall be co-opted from the ordinary Board as will bring the percentage as near as possible to 33 :

Provided that the Board of Higher Studies in Applied Physics shall be constituted as follows:—

(i) Chairman of the Board of Higher Studies in Pure Physics, *ex-officio*.

(ii) University teachers in Applied Physics.

(iii) Three persons selected by the Council from amongst its members.

(iv) Three technical experts to be co-opted by the Board of Higher Studies in Applied Physics.

*Note.*—If the Board so constituted does not contain at least three members of the Board of Higher Studies in Pure Physics, it should co-opt one additional member from it.

Provided also that the Board of Higher Studies in Applied Chemistry shall consist of—

(1) Teachers in Applied Chemistry under Section 3; such teachers shall be members *ex-officio*.

(2) Chairman of the Board of Higher Studies in Pure Chemistry, *ex-officio*.

(3) Three persons selected by the Council from amongst its members.

(4) Three technical experts to be co-opted by the Board of Higher Studies in Applied Chemistry.

*Note.*—If the Board does not contain at least three members from the Board of Higher Studies in Pure Chemistry, it should co-opt one additional member from it.

Provided further that the Boards of Higher Studies in Pure Physics and Pure Chemistry shall also consist respectively of the Chairman of the Board of Higher Studies in Applied Physics and of Applied Chemistry as *ex-officio* members and further that if the Boards of Higher Studies in Pure Physics and Pure Chemistry do not contain three members of the Boards of Higher Studies in Applied Physics and Applied Chemistry respectively, they should co-opt one additional member from the relevant Board of Higher Studies.

18. The Senate on the recommendation of the relevant Executive Committee, which shall not be subject to confirmation by the Council, shall appoint a Head of each Department as follows:—

(1) Where there is only one Professor in any Department, the Executive Committee shall recommend that the Professor be appointed the Head of the Department. If there be no Professor and there be a post of Reader, then the Executive Committee shall recommend the occupant to be the Head.

(2) In the case of a Department where clause (1) is not applicable or the relevant Executive Committee forwards a definite recommendation for its supersession in a special case, the Senate shall appoint its Head after considering the recommendation of the relevant Executive Committee.

(3) The Head shall be appointed for five years but he will be eligible for re-appointment:

Provided that the appointment of an officiating Head for a period not exceeding three months may be made by the Executive Committee when necessary.

(4) Where the Executive Committee considers it desirable, it may recommend to the Senate that the term of office of the Head of a Department should terminate. It will be open to the Senate to accept the recommendation provided a two-thirds majority of the members present at a special meeting of the Executive Committee, called for the purpose, is in favour of such recommendation.

The duties of Heads of Departments shall be—

(a) The Head of a Department shall be responsible to the University and primarily to the relevant Executive Committee for carrying out the decisions of the University within the Department and for ensuring efficient working.

(b) He shall be the Chairman of the relevant Board of Higher Studies.

(c) He shall arrange the time-table and distribution of work in consultation with the other teachers of the Department. Any case of difference between the Head of a Department and a teacher of the Department regarding the arrangement of the time-table and distribution of work shall be decided by the Executive Committee concerned.

(d) He shall be responsible for the proper expenditure of money allocated to the Department and for ensuring that a proper account is kept of the appliances, apparatus, etc., in the Department.

“ Proper ” here includes “ in accordance with the procedure decided by competent authority.”

(e) He shall ensure, in consultation with the other teachers, that the students receive such advice and guidance as they may require, with regard to their courses of studies and other matters. He shall also, in consultation with other members of the staff, allocate students to individual members of the staff for tuition and guidance for the purposes generally indicated hereafter in Sections 38 and 39.

(f) He will perform such other duties as have been or may be entrusted to him by the Senate.

19. The Council mentioned in Section 13 is vested with authority, subject to the ultimate control of the Senate (communicated by the Syndicate), to deal with all questions relating to the organisation and management of Post-Graduate Teaching in Science in Calcutta.

The Executive Committee of the Council shall receive and consider reports from the Boards of Higher Studies as to the progress made in their respective subjects and the results of the examinations and shall exercise such supervision and give such directions as may be necessary to ensure regularity of work and maintenance of discipline among the students.

Subject to the provision of Section 22 hereinafter, the Executive Committee will have the power of making temporary teaching arrangements within the Budget grants whenever necessary. But if the proposed arrangements involve additional financial commitments, the Executive Committee shall refer the matter in the first instance to the Post-Graduate Finance Committee, and shall place its recommendation before the Senate for sanction together with a report thereon from the University Finance Committee. The temporary arrangements in such cases shall be subject to the sanction of the Senate.

20. The Board of Higher Studies in each subject shall, for purposes of the Post-Graduate teaching and Post-Graduate examination, make proposals regarding—

(a) courses of study;

(b) text-books or recommended books;

- (c) standards and conduct of examinations;
- (d) teaching requirements from year to year other than preparation of time-table and distribution of work among the members of the staff;
- (e) appointment of examiners; and
- (f) such other matters as may, from time to time, be specified by the Council with the approval of the Senate.

Proceedings of the Boards of Higher Studies shall be subject to confirmation, revision or modification by the Executive Committee which shall also have the power to send such proceedings back to the Boards of Higher Studies for further consideration.

Proceedings of the Executive Committee, except as otherwise provided for, shall be subject to confirmation, revision or modification by the Council which shall also have the power to send such proceedings back to the Executive Committee for further consideration.

Proceedings of the Council shall be transmitted to the Senate through the Syndicate with such observations, if any, as the Syndicate may deem necessary, and shall be subject to confirmation by the Senate.

The Council shall report on any subject that may be referred to it by the Senate. Any member or any number of members of the Senate may make any recommendation and may propose any regulations for the consideration of the Council. The Senate may, if necessary, direct the Council to review its decision on any matter.

21. Each Board of Higher Studies and other competent body under the Post-Graduate Department shall, not less than six months before the termination of the academic session, formulate the requirements of its special department, during the ensuing session, together with an estimate of the probable financial cost. The Executive Committee shall thereupon examine the said requirements and formulate the consolidated demands of all departments for scrutiny and for preparation of the Budget Estimates by the Post-Graduate Finance Committee.

#### APPOINTMENTS

22. (I) Whenever there is a vacancy in a Professorship or Readership other than an Endowed Chair to which special conditions as to the method of appointment may apply in accordance with the provisions of the Trust Deed concerned, a Selection Committee shall be set up constituted as follows:—

Appointments to Professorships and Readerships.

- (i) Vice-Chancellor, *Chairman*.
- (ii) *President* of the relevant Post-Graduate Council.



(iii) One member appointed by the Senate.

(iv) One expert appointed by the Syndicate.

(v) One member appointed by the relevant Executive Committee. Such appointment shall not be subject to confirmation by the Council.

(vi) & (vii) Two experts (not connected with this University) to be nominated by other Universities, bodies or persons on the invitation of the Syndicate after consultation with the relevant Executive Committee.

(viii) One expert nominated by the Chancellor after consultation with the Vice-Chancellor.

(II) Whenever there is a vacancy in a post other than that of a Professor or Reader, a Selection Committee shall be set up constituted as follows:—

(i) Vice-Chancellor, *Chairman*.

(ii) *President* of the relevant Post-Graduate Council.

(iii) *Dean* of the Faculty concerned.

(iv) Head of the relevant Department.

(v) & (vi) Two members to be nominated by the Syndicate, of whom one shall be a Principal or a Teacher of an affiliated College.

(vii) & (viii) Two members appointed by the relevant Post-Graduate Executive Committee, of whom at least one, where possible, shall be a Professor or a Reader of the Department. Such appointment shall not be subject to confirmation by the Council.

(ix) If the Committee thus constituted does not contain any Mahomedan member, the Syndicate shall nominate an additional member who shall be a Mahomedan.

Appointments under Section 22 (I) and (II) shall be made by the Senate only in accordance with the recommendations of the Committee which shall include particular proposals relating to tenure, pay and other conditions of service. The Senate shall have the power only to refer back the recommendations to the Committee for reconsideration.

The procedure laid down in this section shall not apply in the case of a temporary vacancy which is not likely to exceed one year.

23. (1) The Senate may, on the recommendation of the appropriate Selection Committee constituted for the appointment of Professors and Readers, confer on part-time teachers the status of Professors or Readers without any extra remuneration. In these cases such proposals should be initiated in the first instance by the relevant Executive Committee. The Selec-

tion Committee shall follow the same standard in the matter of these Honorary appointments as in the case of Professors or Readers:

Provided that the number of these Honorary appointments shall not exceed three in the case of Professors and six in the case of Readers.

(2) It shall also be open to the Senate to appoint Honorary Lecturers whenever necessary.

24. If, in any particular year, owing to increase in the number of students, the increase in teaching work (particularly tutorial) is such that the normal staff cannot reasonably be expected to cope with it, temporary appointments of Lecturers outside the grade, or of part-time Lecturers, may be made by the Senate. In making such appointments the claims of applicants who have already served the University will be given priority. For such appointments the Executive Committee shall make definite proposals to the Senate for sanction.

25. (1) All whole-time teachers shall be given contracts embodying their terms of engagement.

The contract shall define the term "whole-time teacher."

(2) The following procedure shall be followed with regard to all appointments:

(a) In the case of new appointments whole-time teachers shall ordinarily be engaged on probation for 2 years after which their appointments may be made permanent. In the case of appointment of Professors, this rule may be relaxed.

(b) When any vacancy arises, the post shall be advertised and applications invited. A Selection Committee, in accordance with Section 22, shall be set up and shall consider the applications received, together with any statement or recommendation which may be sent by the relevant Executive Committee. The choice of the Selection Committee shall not necessarily be confined to those who have applied.

(c) No appointment shall be made unless the Selection Committee is satisfied that the candidate possesses the full minimum qualifications considered necessary for the post.

(3) The above rules shall not apply in the case of the present incumbents who will be re-appointed on the recommendation of the Special Selection Committees under Section 27.

(4) The whole-time teachers including Professors will be granted such leave as may be admissible to them under rules framed by the Senate from time to time.

The relevant Executive Committee will have the power to grant leave to part-time teachers as may be considered necessary provided that the leave so granted shall not be more liberal than that admissible to whole-time teachers.

(5) All whole-time teachers in grade shall retire at the age of 60 subject to the proviso that by a special resolution of the Senate, their term of appointment may be extended up to 65 on the recommendation of the relevant Executive Committee and the Syndicate.

25A. The procedure laid down in Sections 22 and 25 (2) (b) relating to the appointment of teachers shall not, unless otherwise decided by the Senate, apply in the case of an extension of a teacher's appointment beyond the age of 60 or of the making permanent of an appointment which was temporary or for a short period or probationary in the first place but which was advertised as a possible permanent vacancy. Such renewals or extensions shall be made by the Senate on the recommendation of the relevant Executive Committee and the Syndicate.

#### POST-GRADUATE FINANCE COMMITTEE

25B. A Post-Graduate Finance Committee shall be appointed annually for the Post-Graduate Departments in Arts and Science, other Teaching Departments, if any, and also the Trust Funds in so far as and to the extent such Funds obtain the contributions from the General Fund.

The Post-Graduate Finance Committee shall consist of—

- (1) The Vice-Chancellor.
- (2) The President, Council of Post-Graduate Teaching in Arts.
- (3) The President, Council of Post-Graduate Teaching in Science.
- (4) & (5) Two members to be nominated by the Executive Committee of the Council of Post-Graduate Teaching in Arts.
- (6) & (7) Two members to be nominated by the Executive Committee of the Council of Post-Graduate Teaching in Science.
- (8) One member to be nominated by the Syndicate.
- (9) One member to be nominated by the Senate.

If the same person holds more than one office under (1), (2) and (3) above, the Senate shall give necessary directions for appointment of a substitute member or members.

The Committee shall elect its own President each year. The Secretary of the Post-Graduate Department will be the Secretary of the Committee *ex-officio*. Five members shall constitute a quorum.

It shall be the duty of the Committee to prepare the Budget Estimates of the Teaching Departments of the University after scrutinising the demands made by the Executive Committees or other relevant bodies. The Budget Estimates shall then be

placed before the University Finance Committee for preparation of the consolidated Budget of the University in its final form.

All proposals involving new expenditure during the year (not covered by Budget grants) shall be placed before the Committee for scrutiny. Such scrutiny shall involve consideration of the merits of different schemes as well as their financial implications. The recommendations of the Committee shall be placed before the University Finance Committee for submission to the Senate or other relevant authorities for sanction. No action shall be taken by the body concerned in respect of such proposals (except in cases of emergency) until after such sanction has been obtained.

The Post-Graduate Finance Committee shall maintain a watch over the progress of income and expenditure as provided for in the Budget.

The Committee shall frame from time to time rules which shall be considered by the Executive Committees of the Councils of Post-Graduate Teaching in Arts and Science at a joint sitting and, together with such observations as they may make thereon, shall be laid before the Senate for sanction.

#### SECRETARY

26. There shall be a salaried and whole-time Secretary to the Councils of Post-Graduate Teaching in Arts and Science and its Executive Committees. He shall be appointed by the amalgamated Council of Post-Graduate Studies subject to confirmation by the Senate. Until the Post-Graduate Councils are amalgamated he shall be appointed at a joint meeting of the two Executive Committees subject to confirmation by the Senate.

The Secretary shall be assisted by a permanent staff of subordinate Assistants and servants.

#### TRANSITORY REGULATIONS

27. (1) For each teaching department in the University a Special Selection Committee shall be constituted as set forth hereafter. It shall select whole-time members of the present staff for appointment on a permanent basis in accordance with the scheme laid down for the purpose by the Senate.

(2) This Special Selection Committee shall consider the work and qualifications of all existing members of the staff and a report thereon from the relevant Executive Committee and, where such work has been satisfactory, shall recommend to the Senate that the whole-time teachers be given permanent appointments, provided that the number of such appointments shall not exceed the requirements of the scheme referred to.

above. Where the number of teachers who have given satisfactory service is greater than the number of posts to be filled, the Special Selection Committee shall make definite recommendations as to which teachers shall constitute the permanent cadre.

(3) On the recommendation of the Special Selection Committee, the Senate will also appoint part-time Lecturers for such period as it may decide.

(4) Each of the Special Selection Committees stated above shall consist of 8 members and shall be constituted as follows:—

(i) The Vice-Chancellor, *Chairman*.

(ii) The President of the Post-Graduate Council concerned.

(iii) & (iv) Two members appointed by the Executive Committee of the relevant Post-Graduate Council, of whom (a) one shall be an expert (if possible a Professor of the Board concerned but not a whole-time or a part-time Lecturer in the subject in which the appointment is being made) and (b) one other member not connected with the Board concerned. Such appointment shall not be subject to confirmation by the Council.

(v) & (vi) Two members nominated by the Syndicate, of whom at least one shall be an expert who shall not be a member of the teaching staff of the University. Whenever possible this expert shall be selected from the staff of another University.

(vii) Dean of the Faculty concerned.

(viii) An expert in the subject to be nominated by the Chancellor after consultation with the Vice-Chancellor.

## Part II

### Post-Graduate Teaching Outside Calcutta

28. The Heads of Colleges outside Calcutta, not affiliated up to the M.A. or M.Sc. standard in a subject, may, from time to time, submit to the Registrar the names of Professors in their respective Colleges who are prepared to deliver lectures on, and conduct classes for, research or advanced work for Post-Graduate courses of study in such subject.

29. The Syndicate shall place each name so recommended before the Board of Higher Studies concerned, and shall, after consideration of the report of the Board, recommend to the Senate Lecturers for Post-Graduate courses of study. In recommending Lecturers, for any course, the Syndicate shall have regard to (a) the qualifications of the applicant, (b) the desirability of avoiding an unnecessary multiplication of lectures on the same subject in the same centre, and (c) in the case of Science subjects, the equipment for advanced practical work which can be provided.

30. The Senate shall have power, upon the recommendation of the Syndicate as aforesaid, to appoint such persons Lecturers for Post-Graduate instruction. Such Lecturers shall in the first instance be appointed for two years, but they shall be eligible for re-appointment for such term as the Senate may determine in each instance.

31. Every Lecturer thus appointed or re-appointed must deliver at least 30 lectures in the course of the academical year.

32. If a lectureship becomes vacant before the expiry of the term of appointment, the Senate may, on the application of the College in which the lectureship is held, appoint a temporary Lecturer for the remainder of the original term. The procedure prescribed in Section 29 shall be followed in such cases.

33. Nothing in this chapter shall be deemed to debar in any way the affiliation of Colleges outside Calcutta to the standard of M.A. or M.Sc. Examination in any subject under the provisions of Chapter XVIII of the Regulations.

### Part III

#### General

34. All persons other than University Professors, appointed under Sections 3, 30 and 32, shall be styled "University Readers or University Lecturers" as the case may be.

35. The Board of Examiners in each subject for the M.A. and M.Sc. Examinations shall consist of—

- (a) Internal Examiners, and
- (b) External Examiners.

The Internal Examiners in any subject shall be such of the members of the Board of Higher Studies in that subject as have been appointed teachers under Section 3. The External Examiners shall be appointed by the Executive Committee on the recommendation of the Board of Higher Studies concerned.

*Explanation.*—It is not intended that every member of the Board of Examiners thus constituted shall actually frame questions or examine answer-papers; this work shall be shared by the members of the Board in such manner as they may determine. But the results of the examinations in any subject shall be submitted to, and reported upon, by the entire Board of Examiners in that subject.

36. No person whose salary is, or is to be, paid from funds supplied by Government, shall be appointed or re-appointed University Reader or University Lecturer, without the previous sanction of Government. The names of all other persons appointed or re-appointed University Readers or University Lecturers shall be notified to the Local Government within one week from the date of the decision of the Senate. If, within

six weeks from the receipt of such notification, Government intimate to the University that a specified appointment is objectionable on other than academic grounds, such decision shall take effect and the appointment shall stand cancelled.

37. The Senate, on the recommendations of the Councils, shall, from time to time, frame rules, consistent with the Regulations, to facilitate the management of Post-Graduate Studies in Calcutta.

In particular, and without prejudice to the generality of the foregoing powers, such rules may

(a) define the duties of the President of a Council;

(b) provide for the appointment of a Vice-President of a Council, and define his duties;

(c) provide for the appointment of a teacher as Principal;

(d) provide that teachers appointed under clauses (a) and (b) of Section 3 be attached to an affiliated College in Calcutta or participate in the work of instruction of Under-Graduate students of affiliated Colleges, with the concurrence of the University, the Colleges and the Teachers concerned;

(e) provide for the assignment of students to tutors and define their relation;

(f) regulate the conditions of residence of Post-Graduate students;

(g) provide that a Post-Graduate student may, with the permission of the Principal of the College from which he graduated, continue to be a member of such College and that his name may be borne on its rolls;

(h) provide for the due recognition of the association of a student with an affiliated College under the preceding clause or otherwise;

(i) provide for joint meetings of the Councils, Executive Committees and Boards of Higher Studies.

38. Notwithstanding the Regulations hereinbefore contained the name of a student of the Post-Graduate Classes in Calcutta may, with the permission of the Principal of the College from which he graduated, continue to be borne on the rolls of such College; and he may reside in the College hostel or attached mess, enjoy the benefit of the College library, laboratory and other like institutions, and receive assistance in his studies from the College staff. Such student, in so far as he is a member of the College, shall be subject, in matters of discipline to the authority of the Principal.

A student of the Post-Graduate Classes in Calcutta who is unable to attach himself to the College from which he graduated, may, with the sanction of the Executive Committee concerned, attach himself to another College, and, thereupon, the provisions of the preceding paragraph shall apply to such student.

Students of the Post-Graduate Classes in Calcutta who are unable to attach themselves to a College under either of the preceding paragraphs and who do not reside with their parents, guardians or families, shall be subject to such rules for their residence and control as may from time to time be prescribed by the Senate on the recommendations of the Councils.

39. Every student of the Post-Graduate Classes in Calcutta shall be assigned by the Board of Higher Studies in his subject to a particular member of the staff as tutor. It shall be the duty of such tutors (in accordance with rules to be framed from time to time by the Senate on the recommendations of the Councils) to see their pupils singly or in groups at stated times, to advise them with regard to the lectures they should attend and to their courses of reading and practical work, and to assist them in any difficulties that they may encounter in their studies.

40. Nothing in these Regulations shall be deemed to authorise interference in any shape with the rights and obligations of the Governing Body of the Sir Taraknath Palit Trusts and the Board of Management of the Sir Rashbehary Ghose Endowments or with their control of the Sir Taraknath Palit Laboratory or with the work of the Professors and other officers and scholarship-holders appointed under those endowments.

#### RULES OF PROCEDURE

41. Each Council shall meet ordinarily four times a year and on other occasions when convened by the President.

Each Board of Higher Studies shall meet ordinarily four times a year and on other occasions when convened by the Chairman.

A special meeting of a Council shall be convened on the requisition of six members; a special meeting of an Executive Committee or of a Board of Higher Studies shall be convened on the requisition of three members.

42. At meetings of a Council and its Executive Committee the President shall preside and at a meeting of a Board of Higher Studies the Chairman shall preside. In the absence of the President or Chairman, as the case may be, or when the office of President or Chairman is vacant, the members present shall elect a Chairman for the occasion.

43. Five clear days' notice shall be given for meetings of the Councils and of the Boards of Higher Studies; three clear days' notice shall be given for meetings of the Executive Committees.

44. Fifteen members of a Council shall constitute a quorum and the quorum of an Executive Committee or a Board



of Higher Studies shall be the number representing one-third of the members in each case.

45. The rules for debate contained in Chapter I of the Regulations shall apply to meetings of the Councils as far as practicable, but the Chairman of the meeting may relax their operation at his discretion.

46. The election of members of the Executive Committees [as contemplated by clause (7) of Sections 6 and 15] shall take place at special meetings, of which fifteen clear days' notice shall be given by the Secretary. Each member of the Council will, on receipt of the notice, be entitled to propose the name of one person for election to the Executive Committee. Such proposals must reach the Secretary seven clear days before the meeting. The Secretary shall cause lists of the nominees to be printed and forwarded to the members concerned four clear days before the meeting. In any contested election, the voting shall be by ballot and the procedure shall be the same as that laid down in Sections 63-65 of Chapter I of the Regulations.

47. The procedure prescribed in the preceding section shall, *mutatis mutandis*, be followed in the election and co-option of members of Boards of Higher Studies [as contemplated by clauses (b) and (c) of Sections 8 and 17].

48. If by reason of death, resignation, or like cause, a vacancy occurs in any of the Councils, Executive Committees, or Boards of Higher Studies, between the dates of two annual elections, the Body concerned shall forthwith fill up the vacancy and in such event the same procedure shall be followed as in the case of an annual election.

49. From the date of commencement of the Regulations contained in this chapter, a fund shall be constituted for the promotion of Post-Graduate studies, to be called "The Post-Graduate Teaching Fund." To such fund there shall be annually credited

(a) grants from Government and benefactions made specifically for this purpose by donors

(b) fees paid by students in the Post-Graduate Classes;

(c) one-third of the fees realised from candidates for the Matriculation, I.A., I.Sc., B.A. and B.Sc. Examinations; and

(d) such other sums as the Senate may from time to time direct.

50. The powers conferred on the Councils, Executive Committees and Boards of Higher Studies by the provisions of this chapter shall be exercised by those bodies, respectively, in the manner and subject to the restrictions proscribed herein, and such power shall not be exercised by any other bodies in the University.

## CHAPTER XII

### ELECTION OF FELLOWS BY FACULTIES

The following procedure shall be adopted in the election of Ordinary Fellows by Faculties under Section 9 of the Indian Universities Act:—

1. Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows elected by the Faculties. Such election shall take place at special meetings of the Faculties convened for the purpose.

2. An election under Regulation 1 shall be held, subject to such direction prescribing the qualifications of the persons to be elected as may, from time to time, be given by the Chancellor, with a view to secure the return of duly qualified persons and the fair representation of different branches of study in the Senate.

3. Elections of Ordinary Fellows by the Faculties shall be made in such manner as to secure that not less than two-fifths of the whole number of Fellows elected by the Faculties shall be persons following the profession of education.

4. Names of candidates fulfilling the conditions prescribed under Regulation 2, must be proposed in writing by a Member of the Faculty which is to make the election. The nomination shall be in a form to be prescribed from time to time by the Syndicate, and shall reach the Registrar seven clear days before the date fixed for the election.

Each nomination must be accompanied by a brief written statement of the special qualifications of the nominee.

The Registrar shall cause a list of the nominees and the statements concerning them to be printed and forwarded to the Fellows concerned four clear days before the meeting.

5. The elections shall be held in accordance with Regulations 63, 64 and 65 of the Senate Regulations.

6. The election of any Fellow by a Faculty shall be subject to the approval of the Chancellor.

7. If, upon the election of an Ordinary Fellow by a Faculty, objection is taken that the election has not been held

in accordance with the Regulations framed for the purpose or the directions given by the Chancellor, written notice of such objection shall be given to the Registrar within three days after the election; such notice shall specify the ground upon which the validity of the election is questioned. The Registrar shall place the notice before the Vice-Chancellor or the Senior Ordinary Fellow of the Senate, as the case may be, who shall, thereupon, convene a meeting of the Senate for the consideration of the matter on as early a date as practicable. The Senate, if satisfied that the election has not been held in substantial compliance with the Regulations or the directions given by the Chancellor under Section 9, sub-section (2), may direct the Faculty to hold a new election or may give such other directions as may be necessary in the circumstances.

If notice of objection is given to the Registrar as provided by this Regulation, the name of the Fellow elected by the Faculty shall not be submitted to the Chancellor for approval under Section 6, sub-section (3) of the Indian Universities Act till the matter has been considered by the Senate.

## CHAPTER XIII

### ELECTION OF FELLOWS BY GRADUATES

The following procedure shall be adopted in the election of Ordinary Fellows by Registered Graduates under Section 7 of the Indian Universities Act:—

1. Once in every year, on such date as the Chancellor may appoint in this behalf, there shall, if necessary, be an election to fill any vacancy among the Ordinary Fellows to be elected by Registered Graduates.

2. No person, unless his name has been entered in the Register of Graduates and unless he has paid the fee for the year in which the election takes place, shall be qualified to vote or to be elected at any election held under Regulation 1.

3. Intimation of the date fixed for election shall be sent to Registered Graduates at least thirty-five clear days in advance, and each Registered Graduate will, on receipt of the notice, be entitled to propose the name of one person for appointment as a Fellow. Such proposal must be accompanied by a brief written statement of the special qualifications of his nominee, and must reach the Registrar twenty-one clear days before the date fixed for election. It shall also be accompanied by a declaration signed by the candidate himself as assenting to the nomination.

Any candidate may withdraw his candidature by notice in writing subscribed by him, which must reach the Registrar seventeen clear days before the date fixed for election.

If the number of candidates who are duly nominated and who have not withdrawn their candidature in the manner and within the time specified above exceeds that of the vacancies, the Registrar shall cause a list of the nominees and of the statements to be printed and forwarded to the Registered Graduates fifteen clear days before the date fixed for election.

If the number of candidates is equal to the number of vacancies, the candidates shall be declared duly elected subject to the approval of the Chancellor.

4. Each voter shall have only one vote for each vacancy which is to be filled up and can give only one vote to any one candidate.

5. The votes shall be recorded and attested in such manner as the Syndicate may, from time to time, determine. The votes shall be recorded before the Registrar or reach him by such time on the day of election as the Syndicate may prescribe.

6. Those who obtain the highest number of votes will be declared elected. In the event of there being any tie between two or more candidates necessitating further selection, their names shall be reported to the Chancellor with whom the final selection shall rest.

7. The election of any Ordinary Fellow by the Registered Act VIII of 1904. Graduates shall be subject to the approval of Sec. 6 (3). the Chancellor.

8. If, upon the election of an Ordinary Fellow by Registered Graduates, objection is taken that the election has not been held in accordance with the Regulations framed for the purpose, written notice of such objection shall be given to the Registrar within three days after the election. Such notice shall specify the ground upon which the validity of the election is questioned. The Registrar shall place the notice before the Vice-Chancellor, or the Senior Member of the Syndicate, as the case may be, who shall, thereupon, convene a meeting of the Syndicate for the consideration of the matter on as early a date as practicable. The Syndicate, if satisfied that the election has not been held in substantial compliance with the Regulations, may direct the Graduates to hold a new election, or may give such other direction as may be necessary in the circumstances.

If notice of objection is given to the Registrar as provided by this Regulation, the name of the Fellow elected by the Graduates shall not be submitted to the Chancellor for approval under Section 6, sub-section (3) of the Indian Universities Act till the matter has been considered by the Syndicate.

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## CHAPTER XIV

### REGISTER OF GRADUATES

1. The Register of Graduates to be kept under Section 7 (2) of the Indian Universities Act shall be in such form as the Syndicate may from time to time prescribe.

2. The initial fee payable by a Graduate for having his name entered on the Register shall be Rs. 10.

3. The fee payable by a Graduate for having his name retained on the Register shall be Rs. 10 a year. The annual fee shall cover the period from the 1st of April in the year in which it is paid till the 31st of March in the year following. Till such fee has been paid no Graduate shall be entitled to take part in any election or to enjoy any of the privileges conferred by these Regulations.

4. When a Graduate applies to have his name entered on the Register after the expiry of the limited time prescribed under Section 7, sub-section (2) of the Indian Universities Act, he shall be liable to pay, in addition to the initial fee, a further sum of Rs. 10.

5. A Graduate whose name has been already entered on the Register may at any time compound for all subsequent payments of the annual fee by paying the sum of Rs. 150.

Act VIII of 1904,  
Sec. 7 (3).

6. The name of any Graduate entered on the Register shall, if the amount of the annual fee is not paid by the 30th June, be removed therefrom, but shall at any time be re-entered on payment of all arrears.

Act VIII of 1904,  
Sec. 7 (3).

7. The day of the Convocation on which a person is entitled to be admitted to his degree, shall be deemed the day on which he has graduated or taken his degree.

8. Registered Graduates shall have, besides the right of electing Ordinary Fellows, the following privileges:—

Act VIII of 1904,  
Sec. 7 (5).

(a) They shall be entitled to the use of the University Library on such special terms as may, from time to time, be prescribed by the Syndicate.

- (b) They shall be supplied with a copy of the University Calendar or such portions of it as the Syndicate may from time to time decide.
- (c) They shall be admitted free to all lectures delivered by University Professors and Readers.
- (d) They shall have priority of admission to the Convocation over unregistered Graduates.

## CHAPTER XV

### REGISTER OF UNIVERSITY STUDENTS

1. The Registrar shall maintain a Register of all students of the University, including Graduates reading for a higher examination.

In this Register shall be entered the names of such persons only as have passed either the Entrance or the Matriculation Examination subject to the exception mentioned in Regulation 9 of this Chapter. There shall be recorded under the name of each registered student, the dates of admission to, and of leaving, any affiliated College, every pass or failure in a University Examination with his roll number, every University scholarship, medal or prize won by the student, and every degree taken.

2. No person shall be deemed a "University student" unless and until his name has been duly entered in the Register and none but "University students" shall be eligible for admission to any University Examination other than the Entrance or Matriculation.

3. The Principal of every affiliated College shall forward to the Registrar the name of every student of the College within fourteen days of his admission. The Principal shall, at the same time, if necessary, forward the registration fee required by Section 6.

When a student's name has been removed from the books of a College for any reason other than his having been sent up to a University Examination, the fact of its removal shall be immediately reported to the Registrar.

4. In the case of a student seeking registration, the Principal of the College to which he has been admitted, shall inform the Registrar of the date on which such student passed the Matriculation Examination and quote his roll number.

In the case of a registered student joining a College, the Principal shall quote such student's registered number.

5. On registration as a matriculated student every student shall be informed, through his Principal, of the registered number under which his name has been entered in the register, and that number shall be quoted in all subsequent reports concerning that student, and in all applications by that student to be admitted to a University Examination.

6. On matriculation every student shall be required to pay to the University a registration fee of two rupees. when his name is sent in by the Principal.



No further fee for registration shall be charged, unless a student's name is, on non-payment of fees, absence without notice or expulsion, struck off the books of a College, in which case he shall pay one rupee to have his name re-entered in the University Register.

7. All applications for admission to University Examinations shall be liable to be scrutinised by comparison with the University Register, and the Registrar may refuse any application of any candidate about whom complete particulars have not been reported, until he has forwarded through his Principal a complete statement of the particulars which have not been properly reported.

8. Any registered student may, at any time, receive a certified copy of all entries under his name on payment of three rupees.

9. Any person who applies for special permission to appear in an examination under the Regulations relating to non-collegiate students if he has been at any time matriculated in the University, shall quote his registered number or, if he has not been so matriculated, shall register his name as a matriculated student, paying the usual registration fee before he appears in the examination to which he seeks admission.

## CHAPTER XVI

### NON-COLLEGIATE STUDENTS

1. No person who cannot produce a certificate from a College affiliated to the University to the effect that he has completed the course of instruction prescribed by the Regulations, shall ordinarily be admitted as a candidate at any University Examination other than an examination for Matriculation.

2. Exception may be made in certain cases on the recommendation of the Syndicate, by special order of the Senate. In each case the recommendation must state special reasons why the privilege should be granted. A certificate shall be produced in such form as may be prescribed by the Syndicate.

Act VIII of 1904,  
Sec. 19.

3. Except in very special cases no person shall be admitted under the preceding Regulation who has been enrolled as a regular student of a College during the twelve months previous to the date of the Examination at which he applies for permission to appear.

4. Before a candidate is permitted to present himself in any Science subject for which a practical course is necessary under the Regulations, he shall produce a certificate from the Principal of an affiliated College or some other authority approved by the Syndicate, to the effect that he has taken such a course in his Laboratory.

5. Employment as a teacher shall not be regarded as a ground of recommendation unless the applicant has been employed for at least three years preceding the examination in the exercise of his profession in (1) a College affiliated to the University, or (2) a School recognised by the University as competent to send up candidates for the Matriculation Examination, or (3) any other school approved for the present purpose by the Syndicate.

6. Laboratory Assistants and Demonstrators and Librarians of affiliated Colleges shall be treated as teachers.

7. The Syndicate shall have power in any case to admit to any University Examination in any Faculty any person who shall present a certificate from any institution authorised to grant certificates by the Governor-General of India in Council, or by a local Government, or from such other Institutions as may be from time to time recognised for the purpose by the

Syndicate, showing that he has attended courses of study, passed examinations, or taken degrees equivalent to those which are required in the case of students of the Calcutta University.

8. All non-collegiate students before they are admitted to a University Examination, shall satisfy the Syndicate by the production of a certificate as to (a) their good conduct and (b) their diligent and regular study.

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## CHAPTER XVII

### FEMALE CANDIDATES

#### *General*

1. Female candidates, if they so desire, shall be examined in a separate place under the superintendence of ladies.

2. No female candidate shall be admitted to any examination without presenting a certificate in such form as may be prescribed by the Syndicate.

3. All the Regulations for the examination of candidates shall apply to female candidates except in so far as they are modified in the following Regulations or elsewhere:—

#### *Matriculation Examination*

Female candidates shall be allowed to take up any language accepted by the Syndicate as a second language.

#### *Intermediate Examination in Arts or Science*

(i) Female candidates may be admitted to this examination without studying in an affiliated College and Regulations 4 and 8 of Chapter XVI shall apply to them. No candidate, however, shall be allowed to present herself for this examination until two years have elapsed from the time of her passing the Matriculation Examination.

(ii) Female candidates shall be allowed to take up any language accepted by the Syndicate as a second language.

#### *B.A. Examination*

Female candidates may be admitted to this examination without studying in any affiliated College and Regulations 4 and 8 of Chapter XVI shall apply to them. But no candidate shall be allowed to present herself for this examination until two years have elapsed from the time of her passing the Intermediate Examination in Arts.

## CHAPTER XVIII

### AFFILIATION AND DISAFFILIATION OF COLLEGES

1. Colleges or departments of Colleges may be affiliated in Arts or a department of Arts, and similarly in Science, Law, Medicine and Engineering. The affiliation shall be given specifically for each separate subject and each separate standard in each of the Faculties.

2. The privilege of affiliation can only be conferred by the Government on the report of the Syndicate and the Senate. All applications for affiliation must be addressed through the Registrar to the Syndicate.

3. Only Colleges working within the territorial limits defined by the Governor-General in Council under Section 27 of the Indian Universities Act, 1904, which are assigned to this University, will be affiliated.

4. In the case of a Government College, application must be made by the Director of Public Instruction of the province in which the Institution is situated.

In the case of any other Institution application must be made by the Governing Body and submitted through the chief controlling authority, if any.

5. Every application must be countersigned by two Members of the Senate.

6. A College applying for affiliation to the University shall Act VIII of 1904, send a letter of application to the Registrar, Sec. 21 (1). and shall satisfy the Syndicate—

- (a) that the College is to be under the management of a regularly constituted Governing Body on which the teaching staff is represented;
- (b) that the character and qualifications of the teaching staff and the conditions governing their appointment and tenure of office are such as to make due provision for the courses of instruction to be undertaken by the College;
- (c) that the buildings in which the College is to be located are suitable, and that provision will be made, in conformity with the Regulations, for the residence in the College or in lodgings approved by the College, of students not residing with their parents or

- guardians, and for the supervision and physical welfare of students;
- (d) that due provision has been or will be made for a library;
- (e) where affiliation is sought in any branch of experimental science, that arrangements have been or will be made, in conformity with the Regulations, for imparting instruction in that branch of science in a properly equipped laboratory or museum;
- (f) that due provision will, so far as circumstances may permit, be made for the residence of the Head of the College and some members of the teaching staff in or near the college or the place provided for the residence of students;
- (g) that the financial resources of the College are such as to make due provision for its continued maintenance;
- (h) that the affiliation of the College, having regard to the provision made for students by other Colleges in the same neighbourhood, will not be injurious to the interests of education or discipline; and
- (i) that the college rules fixing the fees (if any) to be paid by the students have not been so framed as to involve such competition with any existing College in the same neighbourhood as would be injurious to the interests of education.

The application shall further contain an assurance that after the College is affiliated any transference of management and all changes in the teaching staff shall be forthwith reported to the Syndicate.

The application shall also contain an assurance that, except with the special permission of the Syndicate, no College professor or lecturer will be allowed to lecture to a class or section of a class which has on its rolls more than 150 students, and if two classes are combined, the joint number on the rolls shall likewise not exceed 150.

If any application for special permission is made, the Syndicate in dealing with it shall have regard to—

- (a) the nature of the subject;
- (b) the structure of the lecture-room and its accommodation;
- (c) the qualifications of the lecturer.

In the case of every application for affiliation of a College in any subject for the examination of the degree of Matser in the Faculty of Arts or of Science, a guarantee must be given

that the course in which affiliation is sought will be adequately maintained for a period of at least four years.

Act VIII of 1904,  
Sec. 21 (2), (3) and (4).      7. On receipt of a letter of application the Syndicate shall—

- (a) direct a local inquiry to be made by a competent person authorized by the Syndicate in this behalf;
- (b) satisfy themselves that there is in the College building adequate accommodation both as regards the number of class-rooms, and the floor space and cubic space in each class-room;
- (c) make such further inquiry as may appear to them to be necessary; and
- (d) report to the Senate on the question whether the application should be granted or refused, either in whole or in part, embodying in such report the result of any inquiry under clauses (a), (b) and (c).

And the Senate shall after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

The Registrar shall submit the application and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry as may appear to them to be necessary, shall grant or refuse the application or any part thereof.

When the application or any part thereof is granted, the order of Government shall specify the courses of instruction in respect of which the College is affiliated, and when the application or any part thereof is refused, the grounds of such refusal shall be stated.

Act VIII of 1904,  
Sec. 21 (5).      8. An application for affiliation may be withdrawn at any time before an order has been passed on the application by the Government.

Act VIII of 1904,  
Sec. 22.      9. Where a College desires to add to the courses of instruction in respect of which it is affiliated, the procedure prescribed by Regulations 6 and 7 shall, so far as may be, be followed.

Act VIII of 1904,  
Sec. 23 (2).      10. As a condition of the continuance of affiliation each affiliated College will be inspected from time to time by one or more competent persons authorised by the Syndicate in that behalf.

11. The Syndicate may call upon any College so inspected to take, within a specified period, such action as may appear to them to be necessary in respect of any matter referred to in Regulation 6.

12. The Senate may, on the recommendation of the Syndicate, submit for the orders of the Government at any time, a proposal for the withdrawal of the privileges of affiliation from any College.

The procedure shall be as follows:—

(a) A member of the Syndicate who intends to move that the rights conferred on any College by affiliation be withdrawn, in whole or in part, shall give notice of his motion, and shall state in writing the grounds on which the motion is made.

(b) Before taking the said motion into consideration, the Syndicate shall send a copy of the notice and written statement mentioned in (a) to the Head of the College concerned, together with an intimation that any representation in writing submitted within a period specified in such intimation on behalf of the College will be considered by the Syndicate:

Provided that the period so specified may, if necessary, be extended, from time to time, by the Syndicate.

(c) On receipt of the representation or on expiration of the period referred to in (b), the Syndicate, after considering the notice of motion, statement and representation, and after such inspection by any competent person authorised by the Syndicate in this behalf, and such further inquiry as may appear to them to be necessary, shall make a report to the Senate.

(d) On receipt of the report under (c), the Senate shall, after such further inquiry (if any) as may appear to them to be necessary, record their opinion on the matter.

(e) The Registrar shall submit the proposal and all proceedings of the Syndicate and Senate relating thereto to the Government, who, after such further inquiry (if any) as may appear to them to be necessary, shall make such order as the circumstances may, in their opinion, require.

(f) Where by an order made under (e) the rights conferred by affiliation are withdrawn, in whole or in part, the grounds for such withdrawal shall be stated in the order.

13. If a College affiliated in any subject for the M.A. or M.Sc. standard fails to maintain adequately for a period of four



years the course in that subject, proceedings shall be taken, under the preceding section, to withdraw from the College the privileges of affiliation in that subject.

14. Each affiliated College shall furnish such returns, reports and other information as the Syndicate may require, to enable them to judge of the efficiency of the College.

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Act VIII of 1904,  
Sec. 23 (1).

## CHAPTER XIX

### CONDITIONS TO BE FULFILLED BY COLLEGES AFFILIATED UNDER ACT II OF 1857

1. Every College affiliated to the University before the passing of the Indian Universities Act, shall be entitled to exercise the rights conferred upon it by affiliation, till such rights are withdrawn or restricted in the exercise of any power conferred by that Act or by the Act of Incorporation.

Act VIII of 1904,  
Sec. 20.

For this purpose all Colleges affiliated up to the standard of the First Examination in Arts will be deemed qualified to impart instruction up to the standard of the Intermediate Examination in Arts, but not up to that of the Intermediate Examination in Science.

2. As soon as practicable after the date on which these Regulations come into force, the Syndicate shall cause steps to be taken for the withdrawal of the rights conferred by affiliation from all Colleges situated beyond the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act.

For this purpose, the Syndicate shall ascertain whether any such College is preparing students for any examination of this University; and the date on which the withdrawal of the rights conferred by affiliation will take effect as regards any particular College shall be so regulated as not to prejudice the right of any student to appear at the examination for which he is actually reading in that College.

3. As soon as practicable after the date on which these Regulations come into force, the Registrar shall forward a copy thereof to the authorities of each affiliated College situated within the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act, and invite them to furnish, within three months (or such further time as may be prescribed in any case by the Syndicate), information upon the following points:—

Act VIII of 1904,  
Sec. 23 (1).

- (a) Whether the College is under the management of a regularly constituted governing body; if so, the names of its members and its constitution.

- (b) The names and qualifications of the teaching staff together with copies of their testimonials, and the conditions governing their appointment and tenure of office.
- (c) The size and situation of the College buildings, including the floor space and cubic space in each class-room.
- (d) Provision, if any, made for the residence of such of the students as do not reside with their parents or guardians.
- (e) Provision made for the residence of the Head of the College and of any member of the teaching staff, in or near the College or the place provided for the residence of the students.
- (f) Provision made for the supervision and physical welfare of the students.
- (g) Provision for a library, and the facilities given to students to make use of the library.
- (h) The courses of study, the subjects taught, the routine of work, and the arrangements for exercises and for tutorial assistance.
- (i) The courses of study which the College proposes to undertake in accordance with these Regulations, and the provision which will be made for such courses.
- (j) Where the College proposes to undertake instruction in any branch of experimental Science, what arrangements will be made for imparting instruction in that branch of Science in a laboratory or museum (i) by the delivery of lectures illustrated by experiments, and (ii) by enabling students to carry on practical work.
- (k) The financial resources of the College.
- (l) The College rules fixing the fees, if any.

4. If it appears in the case of any College that it has no regularly constituted governing body, or that it has a governing body upon which the teaching staff is not represented, the Syndicate shall call upon the chief controlling authority to place the College forthwith under the management of a regularly constituted governing body on which the teaching staff is represented.

5. The Syndicate shall obtain from each College an assurance—

- (a) that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate, and

- (b) that from the beginning of the session following that in which these Regulations come into force, except with the special permission of the Syndicate, no Professor or Lecturer will be allowed to lecture to a class or section of a class which has on its rolls more than 150 students, and if two classes are combined the joint number on the rolls shall likewise not exceed 150.

6. The Syndicate shall cause each College referred to in Regulation 3, to be inspected in accordance with the Regulations framed in that behalf, and call upon the College inspected to take within a specified period (which may be extended from time to time at the discretion of the Syndicate) such action as may appear to them to be necessary with a view to secure its efficiency.

7. At the end of two years from the time when these Regulations come into force, the Syndicate shall submit to the Senate a report upon the condition of each affiliated College with a recommendation as to the subjects and standard in which such College shall be deemed to be affiliated. The matter shall be dealt with in accordance with the provisions of Section 24 of the Indian Universities Act, and a report submitted to the Government, who may make such order as the circumstances of each case may require.

8. Each affiliated College shall furnish such returns, reports and other information as the Syndicate may require to enable them to judge of the efficiency of the College.

9. The preceding Regulations shall not apply to the school departments of affiliated Colleges.

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## CHAPTER XX

### INSPECTION OF AFFILIATED COLLEGES

1. The inspection of Colleges shall be conducted jointly by the Inspector of Colleges and by one or two other persons who shall, from time to time, be appointed by the Syndicate to assist in the inspection of a College or a group of Colleges.

In the case of inspection of Colleges affiliated in Arts or Science, the additional Inspector or Inspectors shall be so chosen that both branches of study are represented, if necessary. In the case of Colleges affiliated in any branch of professional learning, the additional Inspector or Inspectors shall be specially qualified in that subject.

2. All Colleges shall be inspected once within eighteen months after the date when these Regulations come into operation. Thereafter every College shall be inspected at least once a year.

3. The report of the Inspectors shall deal with the following among other matters:—

- (a) The constitution of the governing body and the names of its members.
- (b) The suitability of the buildings and their neighbourhood, the accommodation for the students in attendance, the furniture, the lighting, ventilation of the rooms, the drainage of the surrounding premises and the efficiency of the sanitary arrangements.
- (c) The names and qualifications of the teaching staff, the conditions governing their appointment and tenure of office, and the changes in the staff during the preceding year.
- (d) The provision made for the residence of the Head of the College and of the members of the teaching staff in or near the College, or the place provided for the residence of students.
- (e) The adequacy of the Library, scientific apparatus and other teaching appliances
- (f) The courses of study, the subjects taught, the number of lectures delivered in each subject, the routine of work and the arrangements for exercises and for tutorial assistance and the facilities given to students to make use of the Library.

- (g) The adequacy of the teaching staff.
- (h) The strictness with which the College registers are kept and the transfer rules observed.
- (i) The average monthly roll-number and the daily attendance of students during the last twelve months, as compared with the previous years.
- (j) The results of University examinations.
- (k) The state of discipline.
- (l) The provision made for physical exercise.
- (m) College clubs and other institutions for fostering Collegiate life.
- (n) The extent and character of hostel accommodation, the degree of efficiency attained in the supervision of hostels and other lodgings for students; and the distance of such hostels and lodgings from the College premises.

4 The following books shall be kept by every College. —

- (a) An admission register, in such form as the Syndicate may from time to time prescribe.
- (b) An attendance register.
- (c) A student's conduct register showing fines exacted and other punishments.
- (d) A register of the results of periodical examinations and class exercises.
- (e) A register of Transfer Certificates issued and received.
- (f) A cash-book.
- (g) A book containing the proceedings of the governing body.

5 All the accounts, books, and other records of a College shall at all times be open to inspection and examination by any person or persons who may be deputed by the Syndicate for the purpose, provided that any information obtained from the inspection of the accounts shall be deemed confidential.

6. No inspection or examination under these Regulations shall have reference to religious instruction.

7. Every College shall furnish annually a return in such form as the Syndicate may from time to time prescribe.

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## CHAPTER XXI

### RECOGNITION OF SCHOOLS AND WITHDRAWAL THEREOF

1. A school situated within the local limits assigned to the University of Calcutta by the Governor-General in Council under Section 27 of the Indian Universities Act, 1904, which is desirous of being recognised as a school competent to present candidates for the Matriculation Examination, shall send a letter of application to the Registrar.

2. The school shall furnish a preliminary statement showing:—

(a) That the school is under the management of a regularly constituted committee on which the teaching staff is represented, that proper provision is made for the continuance of the existence of such committee, and that the rules are such that the committee can exercise a necessary amount of control over the working of the school.

(b) That the qualifications, character and experience of the Head Master and the rest of the teaching staff are satisfactory, that due provision is made in respect of the number of teachers, and otherwise for carrying on all the courses of instruction in which the school desires to be recognised by the University as competent to present candidates for the Matriculation Examination, and that the conditions governing the tenure of the office of the Head Master and his staff are such as to render proper continuity of work possible.

(c) That the buildings in which the school is carried on are adapted for the purpose of a school and are in proper sanitary condition, that the surroundings are suitable, and that the arrangements made in the buildings and in the furnishing of them are not likely to injure in any way the eyesight and general health of the pupils.

(d) That the accommodation is sufficient for the classes under instruction in the school.

(e) That the sanitary conveniences attached to the school are adequate and are kept in good order.

(f) That arrangements are made for the supply of good drinking water to the pupils, and that facilities are provided to allow them to partake of refreshments.

(g) That due provision is made for the maintenance of a library and for lending out appropriate books (not school textbooks) for the use of pupils.

(h) That when recognition is sought in any branch of work, such as experimental science (1) which involves lectures which should be experimentally illustrated or (2) which involves the students themselves doing practical experimental work, the apparatus and the facilities provided for the purpose are sufficient to carry out these objects properly and fully.

(i) That when any subject proposed to be taught requires for its proper understanding to be illustrated by special appliances, *e.g.*, the subject of Geography by maps and models, and the science subjects by a collection of objects or collections in the form of a museum, such provision has been made.

(j) That the school authorities have made provision to ensure discipline and good conduct among the pupils, both within and without the school premises, and that there are suitable arrangements for their recreation.

(k) That when pupils are not resident with either parents or guardians, the school authorities will insist on such students living either in a hostel or a mess which is duly inspected and placed under the control of some person responsible to the Head Master of the school for the discipline and well-being of such pupils.

(l) That no teacher is allowed to teach—

- (i) in the Entrance Class or Second Class or any section thereof, more than 50 pupils at the same time;
- (ii) in any of the classes from Third to the Sixth, or any section thereof, more than 40 pupils at the same time;
- (iii) in either the Seventh or Eighth Class, or any section thereof, more than 30 pupils at the same time.

(m) That the school authorities have made adequate arrangements for giving a course of physical training to all pupils unless exempted by the Syndicate for any special reason.

2(A). Every school shall be required to make arrangements for imparting training for a specified period according to a prescribed syllabus, and under an approved teacher, in at least *one* of the following subjects:—

- (a) Agriculture and Gardening;
- (b) Carpentry;
- (c) Smithery;
- (d) Book-keeping;
- (e) Spinning and Weaving;
- (f) Tailoring and Sewing;
- (g) Music;
- (h) Basket-making.
- (i) Telegraphy;



- (j) Needlework;
- (k) Drawing and Painting including an appreciation of Fine Arts;
- (l) Cookery.

Such other subject as may, from time to time, be prescribed by the Syndicate.

The Syndicate shall, from time to time, frame rules for specification of the period of training, preparation of syllabus, and recognition of teachers.

The Syndicate may suspend the operation of this section in the case of schools which may be unable, by reason of financial stress or otherwise, to comply with the requirements of the University.

3. The Syndicate shall also require full information as to the financial position of the school and must be satisfied that its financial stability is assured. Information obtained on this head shall not be published.

4. The Syndicate shall also require full information as to the reasons for the establishment of the school, and as to the number of schools of the same standard which exist in the neighbourhood of the proposed school, and it must be shown that the establishment and recognition of the school will not be injurious to the interests of education and discipline.

5. The Syndicate shall also require full information as to the fees, if any, which it is proposed to levy in the school.

6. The Syndicate shall require a school, as a condition of its recognition, to send in to the University once in each year, at such time as the Syndicate may prescribe, a short general report of the working of the school, together with a list of the staff of the school, and of any changes which may have taken place in the staff in the course of the preceding year.

The Syndicate shall also require that at the same time an abstract of the actual annual income and expenditure of the school shall be submitted, and shall insist that the remuneration of the teachers shall be on a reasonable scale and that the other expenditure shall be sufficient to maintain the school in efficiency.

The Syndicate shall also obtain an assurance that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate.

7. On receipt of the letter of application for recognition, and of all such information as the Syndicate may consider to be necessary to establish a presumptive claim for the recognition of the school, the Syndicate shall call for a report on the points dealt with in Regulations 2-5 inclusive from a competent Inspector, and for this purpose the personal report of the

Government Inspector of Schools of the Division in which the school is situated shall usually be considered to be sufficient.

This shall not, however, prevent the Syndicate from calling for special reports by any properly qualified person or persons or any or all of the foregoing points.

Should the person deputed be an Inspector of Schools his report shall ordinarily be submitted through the Director of Public Instruction of the Province in which the school is situated with such remarks as the Director thinks it necessary to make.

8. On receipt of all the required information, the Syndicate shall decide whether the school shall be recognised or not, and if recognised, the exact courses in which such school may submit candidates for the Matriculation Examination shall be stated in the letter of recognition. If a recognised school desires to add to the courses of instruction in respect of which it is recognised, the procedure described in Regulations 2-7 shall, so far as may be necessary, be followed.

9. One of the conditions of recognition, or of the continuance of recognition of a school already recognised shall be that it shall submit to periodic inspection by a person or persons deputed by the Syndicate from time to time. It is desirable that such inspection take place at least once in each school year, and that copies of the inspection reports should be duly communicated to the University by the person or persons so deputed after each such inspection.

9(A). One further condition of recognition or of continuance of recognition of a school already recognised shall be that Vernacular shall be the medium of instruction in all subjects other than English, subject to such exceptions granted by the Syndicate in general accordance with the provisions of Section 7, Chapter XXX of the Regulations.

9(B). Within five years from the date on which these Regulations come into force every school with eight classes shall have at least two teachers on its staff who have obtained the M.A. degree in English or Philosophy or History or Political Economy and Political Philosophy or the B.A. degree with Honours in these subjects or the B.T. degree or the L.T. Diploma or the Diploma in Spoken English or English Teachership Certificate mentioned in Chapter XL-B of the Regulations or the Teachers' Training Certificate with English as a special method subject, or have obtained recognition as teacher in English under Section 9(C). When in a school more sections than one are opened in the four top classes, the number of such qualified teachers shall be increased in a reasonable proportion.

9(C). (i) Head Masters of recognised schools who have taught English on 31st March, 1935, will be recognised as teachers in English.

(ii) Assistant Head Masters and Assistant Teachers who have taught English in a recognised school or schools for at least five years on 31st March, 1935, will also be recognised as teachers in English.

Provided that until such date as the Syndicate may prescribe Head Masters, Assistant Head Masters and Assistant Teachers who have taught English in a recognised school or schools for at least five years before 31st March, 1935, may also be recognised as teachers in English although they may not have been teachers of English in a recognised school on 31st March, 1935, if they are employed as such at the time when they apply to the University for recognition.

(iii) A register containing the names of Head Masters, Assistant Head Masters and Assistant Teachers referred to in sub-sections (i) and (ii) above shall be maintained by the University.

9(D). Three years after these Regulations have come into force no teacher of a recognised school shall be allowed to teach English in any of the classes unless he is qualified to do so under Section 9(B).

9(E). No school shall be allowed to send up candidates for the Matriculation Examination if Class X has been opened without the permission of the University.

10. It shall be competent to the Syndicate at any time to withdraw the privilege of recognition granted under these Regulations or granted under any rules previously in existence, for any one of the following reasons:—

- (a) If a school on an average of three years fails to pass 33 per cent. of the candidates sent up for the Matriculation Examination.
- (b) If the reports of inspections received show that the school is no longer worthy of recognition.
- (c) If it is found that the conditions which were considered essential to the recognition of the school in the first instance and which obtained when the school was placed on the University list are no longer fulfilled.
- (d) For any other reason considered to be sufficient by the Syndicate, the reason to be specified and recorded.

No action shall be taken on (b), (c) or (d) of Regulation 10 without giving the School Committee an opportunity of stating its own case.

In reference to (a) the following procedure shall be adopted:

- (i) In each year, immediately after the results of the Matriculation Examination have been published, the Registrar shall prepare a list of the schools which on the average of the three preceding examinations (including that just ended) have failed to pass 33 per cent. of the candidates sent up for examination.
  - (ii) Such schools shall be warned before the end of July, that if they continue in future years to show unsatisfactory results, their names will be struck off the list of recognised schools.
  - (iii) In the year following such warning, if it is found, after the results of the Matriculation Examination have been declared, that any of the warned schools has again passed less than 33 per cent. of the candidates sent up, the privilege of sending up candidates to the Matriculation Examination shall be liable to be withdrawn from it. In this case notice of withdrawal of the privilege shall be issued by the Registrar not later than the 15th of July of each year, and shall take effect after the Matriculation Examination next following.
  - (iv) If, on the results of the fourth year so considered, the percentage of passes in any such warned school amounts to 33 per cent. no action shall be taken.
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## CHAPTER XXII

### CONDITIONS TO BE FULFILLED BY SCHOOLS NOW RECOGNISED

1. Every school recognised by the University, at the time when these Regulations come into force, shall be entitled to exercise the rights conferred by recognition, till the privileges of recognition are withdrawn in the manner provided in Regulation 10 of Chapter XXI.

For this purpose, every school recognised as qualified to present candidates for the Entrance Examination shall be deemed qualified to present candidates for the Matriculation Examination in all subjects other than Geography and Elementary Mechanics, but no such school shall, without the special permission of the Syndicate, send up candidates for examination in either of these subjects.

If an application for special permission to take up either of these subjects is made, the Syndicate, before granting it, shall satisfy themselves that the school is provided with the necessary appliances and can make proper arrangements for teaching that subject.

2. As soon as practicable after the date on which these Regulations come into force, the Syndicate shall withdraw the privileges of recognition from all recognised schools situated beyond the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act. Such withdrawal shall take effect from a specified date not later than the 30th of April, 1907.

3. As soon as practicable after the date on which these Regulations come into force, the Registrar shall forward a copy thereof to the authorities of each recognised school situated within the territorial limits of the University as defined by the Governor-General in Council under Section 27 of the Indian Universities Act, and invite them to furnish within three months (or such further time as may be prescribed in any case by the Syndicate), information upon the following points:—

- (a) Whether the school is under the management of a regularly constituted committee, on which the teaching staff is represented; whether proper provision is made for the continuance of the existence of such committee, and whether the rules are such that the

committee can exercise a necessary amount of control over the working of the school.

- (b) Whether the qualifications, character and experience of the Head Master and the rest of the teaching staff are satisfactory, whether due provision is made in respect of the number of teachers and otherwise for carrying on all the courses of instruction in which the school is recognised, and whether the conditions governing the appointment and tenure of office of the Head Master and the rest of the staff are such as to render proper continuity of work possible.
- (c) Whether the buildings in which the school is situated and in which the instruction is carried on are adapted for the purposes of a school, and are in proper sanitary condition; whether the surroundings are suitable and the arrangements made in the buildings and in the furnishing of them are likely to injure in any way the eyesight and general health of the pupils.
- (d) Whether the accommodation is sufficient for the classes under instruction in the school.
- (e) Whether the sanitary conveniences attached to the school are adequate and kept in good order.
- (f) Whether arrangements are made for the supply of good drinking water to the pupils, and facilities are provided to allow them to partake of refreshments.
- (g) Whether provision is made for the maintenance of a library and for lending out appropriate books (not school text-books) for the use of students.
- (h) Whether the school intends to undertake instruction in Geography or Elementary Mechanics; if so, whether the appliances and facilities provided are adequate.
- (i) Whether provision is made to ensure discipline and good conduct among the pupils, both within and without the school premises, and whether arrangements are made for their recreation.
- (j) Whether in the case of pupils who do not reside with parents or guardians, provision is made for their residence in lodgings inspected by and under the control of some person responsible to the Head Master for the discipline and well-being of such pupils.
- (k) Whether the remuneration of the teachers is on a reasonable scale.

- (l) The financial resources of the school, and actual annual income and expenditure for the last three years.
- (m) The fees, if any, levied in the different classes of the school.
- (n) The courses of study, the subjects taught, the routine of work, and the arrangements for exercises and for tutorial assistance.

4. If it appears in the case of any school that it has no regularly constituted committee, or that it has a committee upon which the teaching staff is not represented, the Syndicate shall call upon the chief controlling authority to place the school forthwith under the management of a regularly constituted committee on which the teaching staff is represented.

5. The Syndicate shall obtain from each school an assurance—

- (a) that any transference of management and all changes in the teaching staff will be forthwith reported to the Syndicate;
- (b) that after the expiry of twelve months from the date on which a copy of these Regulations is forwarded to the chief controlling authority of the school, no teacher will be allowed to teach.
  - (i) in the Entrance Class or Second Class or any section thereof, more than 50 pupils at the same time;
  - (ii) in any of the classes from the Third to the Sixth, or any section thereof, more than 40 pupils at the same time;
  - (iii) in either the Seventh or the Eighth Class, or any section thereof, more than 30 pupils at the same time;
- (c) that as a condition of the continuance of recognition, the school will submit to regular and periodic inspection by a person or persons deputed by the Syndicate from time to time; and
- (d) that a short general report of the working of the school together with an abstract of its actual annual income and expenditure will be submitted once a year at such time as the Syndicate may prescribe.

6. The Syndicate shall call upon each school referred to in Regulation 3 to take within a specified period (which may be extended from time to time at the discretion of the Syndicate) such action in respect of any of the matters mentioned in Regulations 3, 4 and 5, as may appear to them to be essential

for its efficiency. Upon failure of the school to take the necessary action, after it has been given reasonable opportunity to do so, it shall be liable to have the privileges of recognition restricted or withdrawn, as the circumstances of the case may require. No order, however, shall be made by the Syndicate in this behalf except upon a personal report on the condition of the school at the time, by a competent person deputed for the purpose, and after giving the School Committee an opportunity of stating its own case.

7. The preceding Regulations shall apply to the School Departments of Affiliated Colleges.



## CHAPTER XXIII

### ADMISSION, TRANSFER AND WITHDRAWAL OF STUDENTS

1. These Regulations shall apply only to Colleges affiliated in Arts, Science and Law.

2. At their Annual Meeting the Senate shall appoint a Committee of five Fellows, to be called the Transfer Committee, who shall deal with all questions referred to them in accordance with the following Regulations.

Two members of the Committee and two only shall be persons not connected with any affiliated College.

The proceedings of the Committee shall be submitted every month to the Syndicate for confirmation, and the Syndicate may approve, revise or modify the decision of the Committee on any matter, or direct the Committee to review it. Three members shall form a quorum. In the event of a vacancy occurring between two Annual Meetings of the Senate it shall be at once filled up by the Syndicate.

#### *Admissions*

3. Admission of students to Affiliated Colleges shall ordinarily be allowed only at the commencement of an academical year. If a student applies to a College for admission after 31st July or such other date as the Syndicate may fix in this behalf in any academical year, his case, unless he brings a Transfer Certificate, shall be referred to the Transfer Committee for decision as to whether he may be permitted to join such College.

4. If a student who has passed the Matriculation, or the Intermediate in Arts or Science, or the B.A. or B.Sc. Examination, applies for admission to a College, without having previously joined any other College, he may be admitted upon production of his University Certificate. A student whose name appears in the gazetted list of candidates who have passed one of the aforesaid University Examinations may be provisionally admitted without a certificate, on condition of his producing the certificate within a reasonable time.

5. If a student has been sent up to a University examination, and has either not appeared, or has failed at such examination, he may, on production of the Registrar's receipt, be admitted to any College. The fact of his admission, with the date, shall be written across the face of the receipt.

6. If a student has failed, he shall produce a certificate showing the subject or subjects in which he has failed, which certificate the Registrar shall be bound to furnish within two days after payment of a fee of four annas.

7. A student will be recognised as admitted to a College as soon as he has been accepted by the Principal, and has, where fees are required by the College, paid his admission and first month's fee.

8. When a student has been admitted to an affiliated College, he shall be considered to belong to that College until—

- (a) the end of the academical year in which he has been sent up to a University examination, or
- (b) the date borne on his Transfer or Withdrawal Certificate, or
- (c) he has given notice of withdrawal, or
- (d) his name has been struck off the College books for absence without notice or for non-payment of College fees, or
- (e) he has been expelled.

### *Transfers*

9. If a student has once been admitted to an affiliated College under Regulation 4 or Regulation 5, he shall not, except as otherwise provided, be subsequently admitted to any other affiliated College, without the production of a Transfer Certificate from the Principal of the College in which he has last been reading.

10. When a student has been admitted into a College, he shall not ordinarily be allowed to take a transfer to any other College except at the end of an academical year.

11. Application for a Transfer Certificate must be made by letter to the Principal of the College. It must be signed by the applicant and countersigned by the applicant's parent or guardian.

12. If application is made at the close of an academical year, the only ground on which it can be refused is the failure to pay the sums due to the College, including tuition fees, and fines and transfer fee, if any. If it is so refused the ground of refusal shall be notified in writing to the applicant, who shall have the right of appeal to the Transfer Committee.

13. If a student applies for transfer, against whose name "gross misconduct" has been entered in the University Register of Students, this fact shall be noted in his Transfer Certificate.

14. If a student applies for transfer at any time other than at the end of an academical year on the ground of (1).

transfer of his parent or guardian from the station at which the first College is situated, or (2) desirability of a change of climate and station on the ground of health, duly certified by proper medical evidence, or (3) any other good and sufficient reason, the Principal may grant him a transfer. If the Principal is of opinion that the application for transfer ought not to be granted, he shall, if the student so desires, at once refer the case to the Transfer Committee, stating his grounds of objection.

15. Transfer Certificates under the previous Regulation shall only be issued once a month, except in cases of urgency. The ordinary date of issue shall be the last day of the month, or if this day falls within a vacation or on a holiday, the next preceding working day.

16. A student desiring a Transfer Certificate under Regulation 14 shall submit his application not less than 10 days before the authorised date of issue. Not less than three days before the latter date he shall be informed whether his application has been granted and in that case he shall be furnished with a statement of all the sums due by him to the College. If these dues are paid by him on or before the authorised date of issue, he shall receive his Transfer Certificate on that date.

17. If, owing to the intervention of holidays or some unforeseen contingency, it is found impossible, in accordance with the conditions laid down, to issue the certificate on the last day of the month or the next preceding working day, the certificate shall be issued as soon after as possible, the same notice as specified above being given to the applicant with regard to the sums due by him. The date borne on the Transfer Certificate shall be that of the last day of the month for which the transfer is desired, except in cases of urgency, where the date of the certificate shall be the date of issue.

18. If the student does not pay the sums due by him within the time specified above, he shall not be entitled to his Transfer Certificate until the last day of the month in which he pays his dues, or the corresponding day preceding a vacation or holiday.

19. If application is made for a Transfer Certificate after the commencement of a vacation exceeding fifteen days and extending beyond the last day of the month in which it commences, the certificate, if granted, shall bear the date of the last day of such vacation if this coincides with the last day of a month; otherwise, it shall bear the date of the last day of the preceding month. The student applying for transfer shall submit his application at least six days before and shall receive his certificate, if granted, not later than five days after the end of the vacation. He shall before the issue

of the certificate receive at least three days' intimation of the sums due by him to the College from which he desires transfer, and if these dues are not paid within this time the issue of the certificate shall be deferred in accordance with Regulation 18.

20. All fees for the month corresponding to the date borne on the Transfer Certificate shall be paid to the College from which the transfer is taken, and fees shall likewise be paid to the same College for an additional month if the application for transfer is made before a vacation which commences not more than one month after, and which extends more than one month beyond the date on the certificate. The fact of the payment of such additional fees shall be duly entered on the certificate, and unless a student takes admission to another college within a month of the date of his Transfer Certificate he shall not be liable to pay these fees at the second College.

21. In all cases, a student shall remain on the books of the College from which he seeks a transfer until the date borne on the Transfer Certificate, and his attendance at lectures shall be reckoned up to and including that date.

22. The Transfer Certificate shall be in such form as the Syndicate may from time to time prescribe.

23. A student shall be liable to pay a transfer fee before obtaining his certificate. The transfer fee shall not (except under special orders of the Transfer Committee in the case of Colleges in which no fees are charged) exceed the ordinary monthly fee of the class.

24. If a student applies for transfer who has failed to submit the exercises required of him, or to give satisfaction at the periodical examinations, the fact shall be noted on the Transfer Certificate.

25. If a student applies for transfer who has been refused permission to appear at a University Examination, the fact of such refusal, with the reasons, shall be noted on the Transfer Certificate.

26. If a student applies for transfer who has not been permitted to continue his studies in the College owing to his non-appearance or failure at the College examinations, or who has not been allowed promotion, the fact shall be noted on the Transfer Certificate and he shall not be admitted into a higher class in another College within twelve months.

26A. A Principal may, without assigning any reason, require a student to leave the College if he considers such action necessary in the interest of the institution. He shall in such a case issue a transfer certificate (in a form prescribed by the Syndicate) in his favour free of charge. The certificate shall not.

be issued under this section without the previous approval of the governing body of the College.

Action taken under this section shall be reported to the University.

### *Leaving Certificate*

27. A student temporarily or permanently ceasing his studies may claim a Leaving Certificate, which shall be in the same form as a Transfer Certificate, and for which the same fee, if any, shall be paid.

28. The Principal of a College may accept a Leaving Certificate in lieu of a Transfer Certificate in a session subsequent to that in which it was issued, but not in the same session. Such certificate shall be presented at the beginning of the session, and the student shall ordinarily read from the beginning for the full academical year. But by special leave of the Syndicate the lectures in the College then entered may be reckoned from the day and month corresponding to the date on which the student's connection with his former College ceased.

29. The only grounds on which a Leaving Certificate can be refused are (1) gross misconduct, (2) failure to pay the sums due to the College.

30. If a student gives notice of withdrawal from a College without applying for a Leaving Certificate, he shall only be charged fees up to the end of the month in which he gives such notice.

### *Absence without Notice*

31. If a student is absent without notice for more than one month, his name may be struck off the books, in which case he shall be liable to pay fees for one month subsequent to that in which he last attended the lectures.

32. If a student who has been absent without notice for more than one month applies for a Leaving Certificate, the Principal may, at his discretion, grant such certificate, and may date the student's withdrawal from the day on which he last attended the lectures.

### *Expulsion and Rustication*

33. A Principal may for breach of Collegic discipline—

- (1) suspend a student for one month or less;
- (2) rusticate a student for any period exceeding one month and not exceeding the remainder of the academical year; or
- (3) expel a student.

In the second and third cases the matter shall be reported by the Principal to the Syndicate, in the form of a brief statement including the date of rustication or expulsion.

34. If a student who has been so rusticated or expelled desires to continue his studies in some other College, he may apply to the Syndicate, who shall, after consideration of the circumstances, issue such orders as they may think proper: Provided that no order shall issue permitting such student to continue his studies in another College without a reference to the Principal of the College from which the student has been rusticated or expelled.

### *Miscellaneous*

35. A student before being sent up to a University examination shall be required to pay all sums due to the College in which he has been reading including fees up to the end of the academical year.

36. Any instance of alleged "gross misconduct" on the part of a student when not followed by expulsion or rustication, must be at once notified by the Principal of the College to the Transfer Committee, together with a statement by the student. The Transfer Committee shall determine whether the case shall be recorded in the University Register of Students as one of "gross misconduct". Unless it is so recorded no future action taken on it by the Principal shall be recognised by the University.

37. Wilful transgression or colourable evasion of any of the foregoing rules shall be reported to the Syndicate.

38. All questions arising between one Principal and another respecting the interpretation of these rules, shall be referred as soon as possible to the Transfer Committee.

39. The academical year for the purpose of these Regulations shall be taken to commence on the 1st of June in one year and to end on the 31st of May in the next.

The Syndicate may alter these limits, if necessary.

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## CHAPTER XXIV

### RESIDENCE OF STUDENTS

1. Every student reading in an Affiliated College with the object of appearing at a University Examination, who does not reside with his parents or other legal guardian, or guardian approved by the Principal of his College, shall reside either in his College or in lodgings approved by his College.

Any student making a false declaration in respect of the guardianship under which he is living shall be punished by the Principal of his College, who will deal with the offence as occasion requires.

2. A student shall be held to be residing in a College, if he resides in a Collegiate Hostel as defined under Regulation 7.

3 The following classes of lodging may be approved by a College:—

- (a) Non-Collegiate Hostels, that is, hostels under external management.
- (b) Messes attached or unattached.
- (c) Private lodgings.

4. At the Annual Meeting of the Senate a Committee of six Fellows, not less than three of whom must be Indians, shall be appointed to deal in accordance with these Regulations with questions relating to the residence of students in non-collegiate hostels, messes and private lodgings.

5. This Committee shall be called the Students' Residence Committee. The proceedings of the Committee shall be submitted every month to the Syndicate for confirmation, and the Syndicate may approve, revise or modify the decision of the Committee on any matter, or direct the Committee to review it.

Four members shall form a quorum.

In the event of a vacancy occurring in the course of the year it shall be at once filled up by the Syndicate.

6. Nothing in these Regulations shall be taken to authorise the Students' Residence Committee or any member thereof to interfere with the internal management of a hostel or mess, or with the control of a Principal over his students. But if the

Committee is satisfied, upon the report of one or more of its members, or of an Inspector, that a hostel or mess is maintained or conducted in a manner contravening these Regulations, the Committee shall report the matter to the Syndicate.

### *Collegiate Hostels*

7. A Collegiate Hostel is a Boarding House for students which is under the direct and exclusive control of one College, which is regarded as an integral part of that College, and which admits only those students who are reading in that particular College.

8. The management of a Collegiate Hostel shall be entirely in the hands of the Governing Body of the College to which it belongs. There shall be in every such Hostel a Resident Superintendent, and, if necessary, one or more Assistant Superintendents.

9. The Principal of the College concerned shall frame rules for his Collegiate Hostel, but in the case of every such hostel, the following practices shall be observed:—

- (a) Only male servants shall be employed.
- (b) A roll shall be called both morning and evening.
- (c) Without the special permission of the Superintendent, which shall be recorded in a book kept for the purpose, no student shall absent himself from the Hostel between 9 P.M. and 6 A.M.
- (d) The Superintendent shall keep a Gate Book in which he shall enter the name of any student who returns to the Hostel between the above hours; he shall also enter his remarks against each case.

10. Every Collegiate Hostel shall be inspected once a year by the Inspector of Colleges.

11. Students shall have no right of appeal to the Syndicate against the orders of the Governing Body upon questions of internal discipline.

A student cannot be expelled from a Collegiate Hostel without being also expelled from the College to which it belongs, but he may be transferred to other lodgings under the control of the Principal.

### *Non-Collegiate Hostels*

12. A Non-Collegiate Hostel is a Boarding House for students, under external management. A Non-Collegiate Hostel shall not be recognised unless the individual or individuals responsible for the finances of such Hostel can give reasonable



guarantee for its continued maintenance. Such Hostels may admit only the following classes of boarders:—

- (1) Students of any affiliated College;
- (2) Tutors of such students;
- (3) School boys reading in recognised schools who are nearly related to students residing in such Hostels, and whose parents or guardians desire them to live with or under the direct supervision of such students.

Boarders belonging to classes (2) and (3) shall not be admitted without the sanction of the Students' Residence Committee.

13. Every Non-Collegiate Hostel shall be (a) under the supervision of a Manager and (b) under the general control of a Visiting Committee, both approved by the Students' Residence Committee. The Visiting Committee shall be composed of three persons, of whom at least two shall be representatives of the College or Colleges concerned.

14. All Non-Collegiate Hostels shall be open to inspection by the Students' Residence Committee and by any duly appointed University Inspector. Every such Hostel shall keep an Inspection Book in which the inspecting authorities may enter remarks.

15. There shall be in every such Hostel a properly qualified Resident Superintendent, and, if necessary, one or more Assistant Superintendents.

16. The conditions laid down under Regulation 9, clauses (a), (b), (c) and (d) shall also be enforced as regards all boarders in the case of Non-Collegiate Hostels: and in addition thereto the Superintendent shall keep a Register of the Boarders containing the names and home addresses of the Boarders and of their parents or other guardians. The Register shall contain a column for remarks.

17. Every Non-Collegiate Hostel shall have written or printed rules, and such rules shall not contravene any of the foregoing conditions.

### *Messes*

18. A mess is a temporary Boarding House formed by a combination of students who desire to share expenses.

A mess has not necessarily any fixity of location for a period longer than one academical year, nor does the responsibility for its finances rest with the College or Colleges to which its members belong. Students not otherwise provided for by

these Regulations shall live in messes provided or approved by the College authorities.

19. In the case of messes for which the University or any other public body provides the funds in part or in whole, each mess shall be attached to one College, and the students living in that mess shall be all students of one and the same College, and the Principal of that College shall have full control over that mess. Such messes shall be called attached messes.

The College to which a mess is attached shall appoint a Visiting Committee in consultation with the public body which provide funds for the mess and subject to the approval of the Students' Residence Committee.

20. Regulations 14 to 17 shall apply equally to attached messes.

21. Messes which receive no subvention from public bodies shall be known as unattached messes, and to them shall apply Regulations 12, 14, 15, 16 and 17.

There shall also be a Visiting Committee for unattached messes, consisting of three persons approved by the Students' Residence Committee, two of whom at least shall be representatives of the College or Colleges concerned.

### *Recognition and License*

22. Every Collegiate Hostel must obtain a Certificate of recognition from the University.

All other hostels and all messes must obtain annually, within such time as the Syndicate may determine, a License from the University.

All applications for recognition of Collegiate Hostels shall be submitted by the Governing Body of the College concerned, and shall be dealt with by the Syndicate. Applications for License shall be dealt with by the Students' Residence Committee, and submitted in the case of (a) Non-Collegiate Hostels, by the Proprietor, (b) Attached messes, by the Principal of the College concerned, and (c) Unattached messes, by the College or Colleges concerned.

23. In dealing with applications for Recognition or License, the Syndicate or the Students' Residence Committee, as the case may be, shall have regard to the following points:—

- (a) Suitability of the buildings.
- (b) Adequacy of the accommodation.
- (c) Suitability of the neighbourhood.
- (d) Sanitary conditions.

24. The Senate may from time to time make rules not inconsistent with these Regulations relating to messes and Non-collegiate Hostels.

### *Private Lodgings*

25. Upon the recommendation of the Principal of his College, a student may be permitted to live in his own residence or hired lodgings, provided that (1) if he is under 18 years of age he shall be accompanied by a tutor approved by his parents or other guardian, and (2) in any case the Students' Residence Committee is satisfied that he can be permitted so to live without detriment to his health, studies or character.

### *Miscellaneous*

26. The Students' Residence Committee shall have power to delegate its functions in respect of Muffasil Centres to Local Committees, which shall submit all their proceedings to the Students' Residence Committee, for submission to and confirmation by the Syndicate.

27. The Syndicate may, upon the recommendation of the Students' Residence Committee sanction the admission of the following classes of boarders in Non-Collegiate Hostels:—

- (a) University students.
- (b) School boys attending a recognised School attached to an affiliated College, though such students are not related to any College student residing in the Hostel, provided that the controlling authority of the Hostel gives adequate guarantee for the maintenance of discipline.

28. The Syndicate may, in special and exceptional cases on the recommendation of the Principal controlling an Attached mess and of the Students' Residence Committee, permit one or more students of any other affiliated College or a student of any recognised School, who is nearly related to a member of the mess, to reside in such mess.

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## CHAPTER XXV

### EXAMINATIONS

#### *Setting of Papers*

1. No question shall be asked at any University examination which would require an expression of religious belief on the part of the candidates; and any answer or translation given by any candidate shall not be objected to on the ground of its expressing peculiarities of religious belief.

2. Candidates shall give their answers in their own words as far as practicable in all subjects. This rule shall be inserted as a head note in every question paper.

3. Examiners setting papers shall be guided, as to the scope of the subject of examination, by the syllabus prescribed in the Regulations, and as to the standard and extent of knowledge required, by the books, if any, recommended from time to time for such purpose.

4. No copy of any examination paper is to be retained by the person setting it.

5. The papers set should be such as candidates can reasonably be expected to answer within the time allotted. The questions in each subject should be fairly distributed over the whole course in that subject, and should conform to the Regulations laid down for the particular examination; there should not be any marked change of standard from year to year, but it is not required that the same type of questions should be set every year. Examiners shall always allow some choice of questions.

6. Questions should be so framed as to encourage good methods of work and teaching, and to discourage unintelligent memorizing.

#### *Awarding of Marks*

7. In the case of examinations in all Faculties up to and including the examination for the Bachelor's Degree, the Registrar shall, as soon as the results have been tabulated, prepare a list of the candidates who have failed in one subject only; in order to guard against any possible inaccuracy, their papers in the subject in which they have failed shall be re-examined *on the method of marking already adopted and without any alteration of the standard.*

8. Examiners, in giving marks, shall take the correctness of the language of the answer into account.

9. Examiners, in giving marks, shall consider whether the answers indicate an intelligent appreciation of the subject or are merely the result of unintelligent memory work.

### *Meetings of Examiners*

10. As soon as possible after an examination has been held the persons who have set any question paper in the examination, the Moderators and those who are to examine the answers to that paper or any portion of it and the Head Examiner, if there is one, shall meet to determine the kind or standard of answers to be expected from candidates, and to decide upon a system of marking. Their conclusions shall be embodied in the memorandum to be jointly signed by them and forwarded to the Registrar. If owing to unavoidable circumstances any Examiner who has set a paper or a Moderator who has moderated a paper is unable to attend the meeting, the remaining Examiners contemplated by these Regulations shall meet and transact the aforesaid business.

11. In the case of any examination for the degree of Master or Doctor in the Faculties of Arts and Science, for the degree of Bachelor of Commerce and in the case of every examination in the other Faculties, the entire body of Examiners for that examination shall meet, as soon as possible after the tabulation of the results, and draw up a report of the examination as a whole for the consideration of the Syndicate.

As soon as possible after the publication of the results of every examination in every Faculty referred to in the preceding paragraph, the persons who have examined the answer papers in each subject shall meet together and draw up a report upon the examination in that subject for the consideration of the Syndicate.

12. The reports submitted to the Syndicate shall ordinarily embody such remarks and recommendations suggested by the work done by the candidates which it is thought desirable in the interests of education to communicate to the Heads of Colleges and Schools.

### *Miscellaneous*

13. English shall be the medium of examination in all subjects except where otherwise specifically indicated.

14. Members of the Syndicate or of the Boards of Studies shall not be debarred from acting as Examiners.

15. Canvassing for examinerships will not be countenanced by the University; and if it is proved to the satisfaction of the Syndicate that canvassing has been carried on by any person applying for an examinership, the candidate shall be disqualified.

16. Examiners are required to keep the results of the examinations and the marks assigned to candidates strictly secret.

17. If it is proved to the satisfaction of the Syndicate that the questions in any subject are not such as candidates could reasonably be expected to answer within the time allotted, or have not been fairly distributed over the whole course in that subject, or do not conform to the Regulations laid down for the examination in that subject, or show a marked change of standard, or that from any other cause injustice has been or is likely to be done, the Syndicate shall issue such directions as may be necessary to rectify matters.

18. No candidate shall ordinarily be declared to have passed or to have obtained Honours unless he has attained the standard laid down in the Regulations for a Pass or for Honours. If, however, the Syndicate are satisfied that consideration ought to be allowed in the case of any candidate by reason of his high marks in a particular subject or in the aggregate, the Syndicate may pass such candidate or award him Honours as the case may be:

Provided that no action shall be taken by the Syndicate in this behalf, except—

- (a) upon the Report of the Examination Board concerned in the case of the Matriculation, the Intermediate Examination in Arts or Science, and the B.A. and B.Sc. Examinations, or
- (b) upon the Report of the Examiners in the case of any other Examination.

19. The results of the Matriculation Examination shall be considered annually by the Syndicate with a view to ascertaining the broad lines along which improvement in teaching is necessary and practicable, and the conclusions arrived at shall be communicated to the schools with suggestions as to action. Particular attention should be paid in this connection to the question of the introduction of new and improved methods of teaching English and Science and such of the suggestions either in regard to this question or any other which may arise from a survey of the results, as may be placed before the Syndicate by the agency entrusted with this work and are approved by the Syndicate, shall be communicated to the schools by means of circulars for necessary action.

## ARTS AND SCIENCE EXAMINATIONS

*Appointment of Examiners*

1. The Registrar shall at such times as the Syndicate may determine, send to all Fellows on the Faculties of Arts and Science and to all Heads of Colleges affiliated in Arts and Science who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Boards of Studies concerned who shall be asked to nominate for appointment as Examiners a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number.

The Examiners shall be appointed by the Syndicate after considering the names proposed by the Boards of Studies. In subjects for which there are no Boards of Studies, Examiners shall be appointed directly by the Syndicate.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination of the University except for the Matriculation, I.A., I.Sc., B.A. and B.Sc. Examinations. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the other Member or Members of the Board, if any, otherwise it shall be referred to the Syndicate. For the Matriculation, I.A., I.Sc., B.A. and B.Sc. Examinations, each paper shall be set by one paper-setter only.

4. The Syndicate shall, whenever it may consider it desirable, appoint Head Examiners in different subjects in the case of examinations for which Head Examiners are required. In other cases, as far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. For the Matriculation, the Intermediate in Arts and Science, and the B.A. and B.Sc. Examinations, no one shall be appointed to set a paper in a subject of which he teaches the whole or a part for the corresponding examination.

6. The Board of Examiners in each subject for the degree of Master in the Faculties of Arts and Science shall be composed of—

- (a) the University lecturers in that subject, and
- (b) one or more other Examiners appointed by the Syndicate. Such Examiners shall not be persons lecturing to or preparing candidates for the examination in the subject for which the Board is constituted.

7. Each Board appointed under the preceding Regulation shall meet as soon as possible after appointment for the purpose of apportionment of the examination papers in the subject for which it has been constituted. The appointment as far as the University Lecturers are concerned, shall ordinarily be proportionate to the course covered by their respective lectures. The distribution of papers shall be kept strictly secret.

#### *Moderators :*

#### *B.A. and B.Sc. Examinations*

8. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject, wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) A Committee shall be appointed by the Syndicate for each major subject. This Committee shall be called the Results Committee for the subject concerned. Its duty shall be to consider the results in the subject and modify them, if necessary; such modifications will always be in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

It will always be open to the Examiners in an Honours subject to meet and consider the results in the Honours subject concerned, and submit any report to the Results Committee for its consideration.



Each Results Committee shall consist of the following members:—

- (a) Chairman appointed by the Syndicate.
- (b) Two members selected by the Syndicate from among the Examiners in the subject.

In a subject in which there are Honours candidates, one of these two shall be an Honours Examiner and the other a Pass Examiner.

- (c) The Moderator or Moderators concerned.

If any Moderator is not available, a paper-setter shall be selected by the Syndicate.

- (d) One expert appointed by the Syndicate.

(vi) There shall be one Examination Board for the B.A. and B.Sc. Examinations consisting of—

- (a) The Vice-Chancellor, *Cahirman*.
- (b) Dean of the Faculty of Arts.
- (c) Dean of the Faculty of Science.
- (d) Chairmen of the Results Committees.
- (e) Five members appointed by the Syndicate, of whom two shall be selected from amongst the Members of the Syndicate, one shall belong to the Post-Graduate Department in Arts, one to the Post-Graduate Department in Science, and one to an affiliated College.

The functions of the Examination Board shall be—

- (a) To consider the reports of the Results Committees and co-ordinate them.
- (b) To modify such results, if necessary, in accordance with the principles contained in the Regulations or laid down by the Syndicate.
- (c) To consider all cases of breaches of discipline arising in connection with the examination.
- (d) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vii) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

*I.A. and I.Sc. Examinations*

9. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) There shall be one Examination Board for the I.A. and I.Sc. Examinations consisting of—

(a) The Vice-Chancellor, *Chairman*.

(b) The Head Examiners in the various subjects.

(c) Four members appointed by the Syndicate of whom two at least shall be members of the Syndicate. Of these four, two shall belong to the Faculty of Arts and two to the Faculty of Science.

The functions of the Examination Board shall be—

(a) To consider the results and modify them, if necessary, in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

(b) To consider all cases of breaches of discipline arising out of the examinations.

(c) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vi) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

*Matriculation Examination*

10. (i) Each paper shall be set by one paper-setter.

(ii) The Syndicate shall appoint a Moderator in each subject wherever possible; he shall moderate each question paper in consultation with the paper-setter concerned. It shall be the duty of the Moderator to see that the rules and regulations are strictly complied with.

In special cases the Syndicate may appoint more than one Moderator in a particular subject.

(iii) Each paper is to be signed by the paper-setter and the Moderator.

(iv) The Moderator shall allot the question papers among the different paper-setters, subject to final confirmation by the Vice-Chancellor.

(v) There shall be one Examination Board for the Matriculation Examination consisting of—

(a) The Vice-Chancellor, *Chairman*.

(b) The Head Examiners in the various subjects.

(c) Four members appointed by the Syndicate, of whom two at least shall be members of the Syndicate. Of these four, two shall belong to the Faculty of Arts and two to the Faculty of Science.

The functions of the Examination Board shall be—

(a) To consider the results and modify them, if necessary, in accordance with the principles contained in the University Regulations or laid down by the Syndicate.

(b) To consider all cases of breaches of discipline arising out of the Examinations

(c) To forward the results to the Syndicate for publication.

The statement made to the Syndicate shall contain confidential information on the change made by the Examination Board and the reasons for the change.

(vi) The Proceedings of the Board shall be subject to confirmation by the Syndicate. The Syndicate shall not have the power to modify the results but may refer them back to the Board for reconsideration.

## LAW EXAMINATIONS

### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Law and to all Heads of Colleges affiliated in Law who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the Preliminary, Intermediate and Final B.L. Examinations.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Board of Studies in Law, who shall be asked to nominate for appointment as Examiners a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number. In appointing Examiners, the Syndicate shall consider the recommendations and applications together with the reports of the Board of Studies thereon, but its selection shall not be limited by them. The Dean of the Faculty of Law for the time being shall be *ex-officio* President of the Examiners thus appointed.

3. A Board of Examiners consisting of three or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each examination. The Dean of the Faculty of Law for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the paper shall be among those who look over the answer papers.

For the Preliminary, Intermediate and Final B.L. Examinations, no one shall be appointed Member of a Board of Examiners to set a paper in a subject of which he teaches the whole or a part for the corresponding examination.

## MEDICAL EXAMINATIONS

### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Medicine and to all Heads of Colleges affiliated in Medicine who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications from candidates for examinerships received by the Registrar shall, in the first instance, be referred to the Board of Studies in Medicine who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the

Syndicate, and not more than half in excess of that number. In appointing Examiners the Syndicate shall consider the recommendations and applications, together with the reports of the Board of Studies thereon, but its selection shall not be limited by them. The Dean of the Faculty of Medicine for the time being shall be *ex-officio* President of the examiners thus appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination. The Dean of the Faculty of Medicine for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by all the Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination, one at least must be a Teacher or Professor in that subject, and one at least, whenever available, shall be a person not teaching that subject for that examination.

6. Every oral, practical and clinical examination shall be conducted by two Examiners jointly.

## ENGINEERING EXAMINATIONS

### *Appointment of Examiners*

1. The Registrar shall, at such times as the Syndicate may determine, send to all Fellows on the Faculty of Engineering and to all Heads of Colleges affiliated in Engineering who are not Fellows, a circular requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the University Examinations specified by the Syndicate.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications received by the Registrar shall, in the first instance, be referred to the Board of Studies in Engineering, who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number. In appointing Examiners, the

Syndicate shall consider the recommendations and applications together with the reports of the Board thereon, but their selection shall not be limited by them. The Dean of the Faculty of Engineering for the time being shall be *ex-officio* President of the Examiners so appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination. The Dean of the Faculty of Engineering for the time being shall be *ex-officio* President of each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination, one at least must be a lecturer on that subject, and one at least shall be a person not teaching that subject for that examination.

### *Certificate in Tanning*

1. The Registrar shall, at such times as may be determined by the Syndicate, send to the members of the Board of Higher Studies in Applied Chemistry and to all Heads of Institutions affiliated in Tanning a circular, requesting them to forward within one month the names of persons whom they consider suitable for appointment as Examiners for the Examination for Certificate in Tanning.

Every such recommendation shall be accompanied by a brief statement of the special qualifications of their nominees.

2. Such recommendations and any applications received by the Registrar shall in the first instance be referred to the Board of Higher Studies in Applied Chemistry who shall be asked to nominate a number of persons not less than that required for each examination as indicated by the Syndicate, and not more than half in excess of that number.

In appointing Examiners, the Syndicate shall consider the recommendations and applications together with the reports of the Board thereon, but their selection shall not be limited by them. The Syndicate shall also appoint a President of the Examiners so appointed.

3. A Board of Examiners consisting of two or more persons shall be appointed by the Syndicate, whenever practicable, to set papers in each subject in each examination. The Syndicate shall also appoint a President for each Board. Each paper shall, whenever practicable, be set by two Members of the Board in consultation. In the case of a difference of opinion arising between the two Examiners, the point shall be referred to the President. The papers set shall be moderated by him in consultation with the other Members of the Board.

4. As far as practicable, the Members of the Board who set the papers shall be among those who look over the answer papers.

5. Of the persons appointed to set papers in any subject for any examination one at least must be a lecturer on that subject, and one at least shall be a person not teaching that subject for that examination.

#### *Refund of Fees*

Notwithstanding anything contained in the different chapters of these Regulations, if the admission of a candidate to any examination is cancelled, the Syndicate may refund the fee paid therefor or may appropriate it for use as fee for admission to any subsequent examination of the same standard.

## CHAPTER XXVI

### CONDITIONS OF STUDY IN AFFILIATED COLLEGES

1. A College affiliated in any subject for any of the examinations mentioned in this section shall provide for the delivery of the minimum number of lectures specified hereinafter to students who take up that subject.

(i) Intermediate Examination in Arts or Science—

- (a) 140 lectures in each subject, of which not less than 60 shall be delivered in the second year.
- (b) 70 lectures in Vernacular, of which not less than 25 shall be delivered in the second year:

Provided that the Syndicate may grant exemptions from this rule in cases where the number of students of any College reading a particular Vernacular is so small as to make it difficult to arrange for the delivery of lectures in that Vernacular:

Provided also that in Assam Colleges it shall not be obligatory on the authorities of a College to arrange for lectures in any other Vernacular than that of the majority of the students attending the College.

(ii) B.A. or B.Sc. Examination—

- (a) In the Pass Course in each subject—160 lectures, of which not less than 65 shall be delivered in the second year
- (b) In the Honours Course in each subject—80 lectures in addition to the lectures in the corresponding Pass Course, of which not less than 30 shall be delivered in the second year.
- (c) 70 lectures in Vernacular, of which not less than 25 shall be delivered in the second year:

Provided that the Syndicate may grant exemptions from this rule in cases where the number of students of any College reading a particular Vernacular is so small as to make it difficult to arrange for the delivery of lectures in that Vernacular:

Provided also that in Assam Colleges it shall not be obligatory on the authorities of a College to arrange for lectures in any other Vernacular than that of the majority of the students attending the College.



(iii) M.A. or M.Sc. Examination—180 lectures in each subject.

(iv) Licentiate in Teaching—

Principles of Education	...	30 lectures.
Methods of Teaching and School Administration	...	65 "
History of Education	...	50 "

(v) Bachelor of Teaching—

(a) Principles of Education including Educational Psychology	...	60 "
(b) History of Education	...	30 "
(c) General Methods, School Organisation and School Hygiene	...	30 "
(d) Contents and Methods of Teaching School subjects—20 lectures in each of the three subjects	...	60 "

There shall be provision for laboratory work in Science and practical work in Geography.

(e) Additional subject ... 30 lectures.

(vi) Preliminary, Intermediate or Final Examination in Law—in each subject or group of subjects ... 32 lectures.  
and 12 sittings of a Moot-Court.

In the M.B. Examinations the number of lectures, practical and clinical instructions shall be as prescribed in the syllabuses in Chapters XLIV and XLV.

2. If a College fails for three consecutive years to deliver the minimum number of lectures prescribed above in any subject, proceedings shall be taken under Section 24 of the Indian Universities Act to withdraw from it the privileges of affiliation in that subject.

3. Every lecture shall cover a period of not less than 45 minutes inclusive of the time allowed by the College rules for the assembling of the students.

4. For the purpose of these Regulations a period of practical work or class exercises or class examinations of not less than 45 minutes shall be considered to be equivalent to a lecture.

5. Every candidate who desires to appear as a collegiate student at any one of the examinations mentioned in Section 1 shall be required to prosecute a regular course of study for the time specified in the Regulations in the subjects which he takes up for the examination in question.

6. No student shall be considered to have prosecuted a regular course of study in any subject for any examination unless he has attended at least 75 per cent. of the lectures delivered in that subject in one or more affiliated Colleges.

7. No lecture shall be deemed to be a lecture within the meaning of these Regulations, unless it is delivered to a whole class or permanent section of a class and unless it is reckoned in calculating the percentage of attendance of all students of the class or section who have taken up the subject in which the lecture is delivered.

8. If the College to which the student belongs, is not affiliated in a particular subject which he desires to take up for examination, he may be permitted, by mutual arrangement between the Principals of the Colleges concerned, to attend lectures on that subject in another duly affiliated College.

9. The percentage of attendance of every student under Section 5 shall be calculated on the total number of lectures delivered in each subject from the commencement of the academical year. If a student is transferred from one College to another, the percentage of attendance in the first College shall be calculated on the total number of lectures delivered in each subject up to the date borne on the transfer certificate, and in the second College on the lectures delivered after that date.

10. In cases where a student, after study for the period prescribed by the Regulations, shall have failed to attend 75 per cent. of the lectures in any subject or subjects during this course, he shall not be admitted to the examination as a collegiate student, unless (a) he attends lectures in such subject or subjects for another academical year, and (b) his attendance in the subject or subjects in question for the period prescribed by the Regulations amounts to at least 75 per cent. of the lectures delivered in the College or Colleges in which he studies for the prescribed period:

Provided that the provisions of this section shall not be applicable in so far as the Preliminary, Intermediate and Final Examinations in Law are concerned.

11. The course of study in any subject for the M.A. or M.Sc. Examination under University Teachers shall normally consist of 180 lectures and a student will be considered to have prosecuted a regular course of study in the subject if he has attended 65 per cent. of the lectures delivered in it. If, however, in exceptional circumstances, the total number of University lectures delivered in any subject falls below 180, attendance at 65 per cent. of lectures actually delivered in it will be considered sufficient:

Provided that it shall be competent to the relevant Executive Committee of the Council of Post-Graduate Teaching, on

the recommendation of the Heads of Departments, to relax this percentage rule in special cases.

12. The students of affiliated Colleges or University students who may be in Military or Naval training will, for purposes of admission to their respective examinations, be deemed to have attended all lectures and practical work during such period in their respective classes in the subjects taken up by them provided they produce certificates of having been in such training from the officer under whom they were in training:

Provided also that in the case of students with Science subjects they produce certificates from their Principals or some other competent authority approved by the Syndicate, to the effect that they have taken satisfactory courses of practical work in those subjects:

Provided further that students of the University taking part in Inter-University Athletic contests shall be deemed to have attended lectures or practical classes up to a limit of a total of six days in one academical year, during their absence necessitated by these matches, but that no compensation shall be given to the students taking part merely in Trial matches or Inter-collegiate League matches.

13. Notwithstanding anything contained in the Regulations the Syndicate may give such orders as may be necessary relating to admission and withdrawal of students, residence of students, conditions of study and examinations, conditions to be fulfilled by affiliated colleges and recognised schools, or such other matters as may be deemed necessary for the purpose of control, supervision and conduct of examinations and admission thereto. This regulation shall remain in force for the duration of the War and for such further period as the Senate may by regulation decide.

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## CHAPTER XXVII

### CONDITIONS TO BE FULFILLED BY COLLEGES AFFILIATED IN SCIENCE

#### GENERAL

Colleges affiliated in any Science subject except Geography must be provided with gas and a plentiful supply of water, and there must be adequate connexions for this with the portion of the building allotted to Science teaching. There must be a suitably fitted lecture theatre of the ordinary type, and the lecture table, which should not be less than 12 feet long, must be provided with gas and water fittings, and must also be adapted in other respects for lecture demonstrations in the various sciences for which it is intended to use the theatre. There should be an aperture in one of the walls by which a beam of solar light can be admitted for optical and projection work. One lecture theatre will ordinarily suffice, but if the number of subjects in which the College is affiliated is considerable, additional accommodation in this respect will be necessary. There shall be separate rooms for practical work in each of the subjects for which the College is affiliated, and in each such room there shall be a good black board and a small demonstration table. A sufficient quantity of apparatus, etc., must be provided both for practical and lecture work, and there must be ample cupboard room for the apparatus when not in use. Lists are given in Appendix B shewing what may be considered the minimum requirements in each case. For all Colleges affiliated up to the M.A. or M.Sc. standard in Physics or Chemistry an electric installation is desirable and should certainly be provided wherever there is a town supply of electricity.

#### SPECIAL

##### I.—PHYSICS

(a) *Intermediate Standard*.—Not more than 20 students shall be placed under one teacher in the practical class at one time. If the number exceeds 20, an additional teacher or demonstrator will be required. The size of a room which it is intended shall accommodate the above number of students, shall not be less than 20 feet by 25 feet. If the number of students exceeds 20, the size of the room must be proportionately

increased. The working tables should be small, about 6 feet by 3 feet, and should be very strongly made of teak wood. One or two large sinks with water taps must be provided.

(b) *B.A. or B.Sc. Standard.*—There shall be one teacher to every 15 students in the practical class. The room used for the Intermediate course, having the dimensions given above, will suffice for the B.A. or B.Sc. students and for a class of fifteen, but it is necessary for the work in the present course that each working place on the tables should be supplied with gas. A small room for optical work is desirable, but if it is not possible to provide this a portion of the laboratory, which in this case should be larger, may be screened off for the purpose. A small workshop should be attached to the laboratory.

(c) *M.A. or M.Sc. Standard.*—There shall be one teacher to every 10 students in the practical class. In addition to the general laboratory two other rooms will be necessary, one for optical and the other for electrical work. A larger workshop will be necessary than in the previous case, and it should be furnished with a good lathe. A permanent *mistri* should be employed.

## II.—CHEMISTRY

(a) *Intermediate Standard.*—Not more than 20 students shall be placed under one teacher in the practical class at one time. If the number exceeds 20, an additional teacher or demonstrator will be required. The size of a room which it is intended shall accommodate the above number of students, shall not be less than 20 feet by 30 feet, and if the number of students exceeds 20, it must be proportionately increased. The working benches must be provided with gas, one jet for each student. Those benches which occupy the centre of the room should, for the sake of economy of space, be of double width, so as to admit of students working on both sides, and the shelf for reagents may, in this case, run along the centre of the table. Water taps with the corresponding sinks, should be provided in the ratio of about one to four students but the sinks in the case of the tables of double width, may be replaced by a properly treated wooden trough running along the centre. Two or three fume closets are necessary: one will suffice, if the working tables are supplied with small draught hoods.

(b) *B.A. or B.Sc. Standard.*—There shall be one teacher to every 15 students in the practical class. The laboratory for the Intermediate course can be adapted for the use of the B.A. and B.Sc. students as well. A small and well-lighted balance room and a combustion room must be provided in addition.

(c) *M.A. or M.Sc. Standard.*—An additional laboratory with rooms for special work shall be provided for the use of M.A. and M.Sc. students, not more than ten of whom shall be under the supervision of one teacher.

### III.—PHYSIOLOGY

(a) *Intermediate Standard.*—Not more than 24 students shall be placed under one teacher. The working benches shall be furnished with racks for chemical and microscopical reagents; and gas, water and sinks shall be supplied in the same way as in the chemical laboratory. The size of a room for 24 students shall be not less than 20 feet by 30 feet.

(b) *B.A. or B.Sc. Standard.*—Not more than 12 students shall be placed under one teacher. The room for the practical work of the Intermediate standard can with some light adaptation be also used for the present standard.

(c) *M.A. or M.Sc. Standard.*—For M.A. or M.Sc. classes at least two additional laboratories are necessary for special work.

### IV.—BOTANY

The number of students that may be placed under one teacher in the practical classes is the same as for Physiology and the conditions to be fulfilled with regard to the laboratories are substantially the same as in that subject.

### V.—ZOOLOGY

Not more than 20 students shall be placed under one teacher in the practical classes. Otherwise the requirements are the same as in the case of Physiology and Botany, except that the accommodation required for M.A. and M.Sc. students will not be so great as in those subjects.

### VI.—GEOLOGY

(a) *Intermediate Standard.*—Not more than 15 students shall be placed under one teacher in the practical class.

(b) *B.A. or B.Sc. Standard.*—Not more than 10 students shall be placed under one teacher in the practical class.

### VII.—GEOGRAPHY

There must be a small museum for practical teaching and demonstration, and a well-lighted room suitable for drawing and modelling, and fully furnished with the appliances necessary for the course of practical work prescribed by the Regulations.

## VIII.—PSYCHOLOGY

The laboratory must be furnished with plastic and other models and charts for anatomical and physiological demonstrations, in addition to the appliances necessary for psycho-physical work, and must also be suitable for optical and electrical work.

## IX.—ANTHROPOLOGY

(a) *Intermediate Standard*.—Not more than 24 students shall be placed under one teacher at one time in the practical class. At least two working tables about 6 feet by 3 feet should be provided for in a room adequately suited for the purpose. There shall also be a small museum with the casts, specimens or photographs or slides as stated in the requirements for practical classes. The size of a room for 24 students shall not be less than 20 feet by 30 feet.

(b) *B.A. or B.Sc. Standard*.—Not more than 12 students shall be placed under one teacher. The room for the practical classes in the Intermediate standard may be used for the B.A. or B.Sc. classes provided it is fitted up with the additional requirements as specified in the list for practical appliances. It is also desirable to have a separate room of adequate dimensions for the collections of casts, specimens or photographs as specified.

## X.—STATISTICS

(a) *B.A. or B.Sc. Standard*.—There shall be one teacher to every 12 students in the practical class. The laboratory should be provided with necessary Mathematical and Statistical tables and charts and calculating machines.

(b) *M.A. or M.Sc. Standard*.—There shall be one teacher to every 8 students in the practical class.

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## CHAPTER XXVIII

### UNIVERSITY LIBRARY

1. The Syndicate shall appoint annually two Committees, one to be called the Library General Committee and the other the Library Executive Committee.

The General Committee shall consist of the Vice-Chancellor—*Chairman*, the President, Council of Post-Graduate Teaching in Arts, the President, Council of Post-Graduate Teaching in Science, the Registrar, the Secretary to the Councils of Post-Graduate Teaching in Arts and Science, and twelve other members of whom (a) six shall be members of the Senate, (b) six shall be University teachers, three being appointed on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Arts and three on the recommendation of the Executive Committee of the Council of Post-Graduate Teaching in Science.

The Executive Committee shall consist of the Vice-Chancellor—*Chairman*, the Registrar, the Secretary to the Councils of Post-Graduate Teaching in Arts and Science and three members of the General Committee.

Members of the Committees shall hold office for one session.

In the event of a vacancy occurring in the course of the year it shall be filled up by the Syndicate.

2. The General Committee shall meet ordinarily once every six months, and, at other times, when convened by the Vice-Chancellor. Seven members shall form a quorum.

The Executive Committee shall meet ordinarily once a month, and, at other times, when convened by the Vice-Chancellor. Three members shall form a quorum.

3. The proceedings of the meetings of the Committees shall be recorded and regularly submitted to the Syndicate for confirmation. The Syndicate may approve, revise, or modify the decision of either Committee on any matter, or direct the Committee to review it.

4. The duties of the General Committee shall be—

(I) to recommend to the Syndicate rules regulating—

(a) the use of the Library by Fellows, by Registered Graduates, and by other persons,



- (b) the payment of fees for the use of the Library by persons other than Fellows,
- (c) the conditions of borrowing and returning books,
- (d) the suspension of privileges for the loss, mutilation, or disfigurement of books, or for any breach of the Library Rules.
- (e) the annual inspection of the Library, and
- (f) all other matters relating to the management of the Library;

(II) to recommend to the Executive Committee the purchase of books and manuscripts.

5. The duties of the Executive Committee shall be to give orders for the purchase, arrangement and cataloguing of the books and manuscripts, for the provision of book-cases and other fittings, for the cleaning of the Library, and for all ordinary repairs, and generally to supervise the management of the Library, and to do all that is in their opinion desirable for the maintenance of the Library in an efficient condition, so far as it is practicable to do so within the limits of the annual grant.

6. The General Committee shall prepare its annual Budget Estimates which shall be placed before the Post-Graduate Finance Committee in the first instance for scrutiny and shall then be laid before the University Finance Committee for necessary action.

7. The Syndicate shall make an annual report to the Senate concerning the state of the Library and all matters concerning the Library which in their opinion should be brought to the notice of the Senate. The report shall be accompanied by a statement of the expenditure of all moneys devoted to the purposes of the Library.

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## CHAPTER XXIX

### TRANSITORY REGULATIONS

1. In this chapter the phrase " new Regulations " shall be taken to mean the present body of Regulations.

The phrases " existing Bye-laws," " existing Regulations," and " existing Rules " shall be taken to refer respectively to the Bye-laws, Regulations and Rules in operation on the date previous to that on which the new Regulations come into force.

2. All questions relating to the alteration or cancellation of existing Bye-laws, Regulations and Rules shall be decided with reference to the provisions of this chapter.

Act VIII of 1904,  
Sec. 25 (2) (g).

3. The new Regulations shall come into force on the date of their publication in the *Gazette of India*; such date shall be called the date of commencement of the new Regulations.

4. Except as hereinafter provided, on and from the date on which the new Regulations come into force, all existing

- (i) Bye-laws,
- (ii) Regulations, and
- (iii) Rules which are in any way inconsistent with the new Regulations,

shall cease to have operation.

5. As soon as practicable after the date of commencement of the new Regulations the Vice-Chancellor shall cause steps to be taken for the appointment of the Faculties, the Syndicate, the Boards of Studies, the Board of Accounts, the Library General Committee, the Library Executive Committee, the Transfer Committee, the Students' Residence Committee, the Registrar and the Inspector of Colleges, in accordance with the new Regulations :

Provided that any act which is required by the new Regulations to be done, at, before, or after an annual Meeting, may for this purpose be validly done, at, before, or after a Special Meeting.

6. As soon as each of the Faculties, the Syndicate, each of the Boards of Studies and the Board of Accounts is duly constituted under Regulation 5, the corresponding body provisionally constituted under Section 12 (g) of the Indian Universities Act, shall cease to exist :

Provided that each of these provisional bodies so long as it continues to exist, shall discharge its functions in accordance with the existing bye-laws, which shall be deemed to be in force for this purpose.

7. The Faculties, the Syndicate, the Boards of Studies, the Board of Accounts, the Library General Committee, the Transfer Committee, the Students' Residence Committee and the Library Executive Committee appointed under Regulation 5 shall continue to hold office till they are reconstituted in 1908 in accordance with the new Regulations.

8. The Registrar holding office at the commencement of the new Regulations shall continue to hold office till the Registrar appointed under Regulation 5 assumes charge. If, in the interval, there is a vacancy in the office of the Registrar, the Syndicate may appoint an Acting Registrar on such terms as may be found necessary. The Registrar appointed under Regulation 5 shall continue to hold office not later than the 31st of March, 1912.

9. The Inspector of Colleges appointed under Regulation 5 shall continue to hold office not later than the Annual Meeting of the Senate in 1912.

10. The Matriculation Examination shall be held for the first time in accordance with the new Regulations in 1910.

11. The Entrance Examination in 1907, 1908, and 1909 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

12. Any person who passes or has passed the Entrance Examination shall be deemed qualified for admission to any University Examination other than that mentioned in Section 42 in the same manner as if he had passed the Matriculation Examination in accordance with the new Regulations.

13. The Intermediate Examination in Arts shall be held for the first time in accordance with the new Regulations in 1909.

14. The First Examination in Arts in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

15. Any person who passes or has passed the First Examination in Arts shall be deemed qualified for admission to any University Examination other than that mentioned in Regulation 42 in the same manner as if he had passed the Intermediate Examination in Arts or the Intermediate Examination in Science in accordance with the new Regulations. For the purpose of the Examination mentioned in Regulation 42 of this chapter, a student, who has passed the

F.A. or the Intermediate in Arts, shall be deemed qualified in the same manner as a student who has matriculated in accordance with the new Regulations.

16. Any candidate who fails at the First Examination in Arts in 1908 or has failed in any previous year, or who was qualified to appear at any such examination but did not appear, or who was not sent up to any such examination by reason of deficiency in attendance at lectures, or who was not permitted by the Principal of his College to appear, may be admitted to the Intermediate Examination in Arts or the Intermediate Examination in Science in 1909, provided he has prosecuted, in accordance with the new Regulations, a regular course of study for one academical year in the subjects he offers. Any candidate appearing at a subsequent examination shall strictly comply with the new Regulations.

17. The B.A. Examination shall be held for the first time in accordance with the new Regulations in 1909.

18. The B.A. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

19. The M.A. Examination shall be held for the first time in accordance with the new Regulations in 1909.

20. The M.A. Examination in 1906, 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

21. Any Bachelor of Science who, in or before 1908, passes or has passed the M.A. Examination in Mathematics or in any branch of Natural or Physical Science, shall be entitled to the same privileges for the purpose of admission to University Examinations as if he had passed the M.Sc. Examination in accordance with the new Regulations.

22. The Examination for the Degree of Doctor of Philosophy shall be held for the first time in accordance with the new Regulations in 1907.

23. The Intermediate Examination in Science shall be held for the first time in accordance with the new Regulations in 1909.

24. The B.Sc. Examination shall be held for the first time in accordance with the new Regulations in 1909.

25. The B.Sc. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

26. The M.Sc. Examination shall be held for the first time in accordance with the new Regulations in 1909.

27. The Examination for the Degree of Doctor of Science shall be held for the first time in accordance with the new Regulations in 1908.

28. The Examination for the Degree of Doctor of Science in 1906 and 1907 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

29. The Preliminary Examination in Law shall be held for the first time in accordance with the new Regulations in 1908.

30. The Final Examination in Law shall be held for the first time in accordance with the new Regulations in 1909.

31. The B.L. Examination in 1906, 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

32. (i) Any candidate who fails at the B.L. Examination in 1908, or has failed in any previous year, or who was qualified to appear at any such examination but did not appear, may, in any year not later than 1912, appear at the Preliminary Examination in Law, and, if he passes, may appear at the Final Examination in Law in the same year or in any subsequent year not later than 1912.

(ii) Any candidate who is not or has not been sent up to the B.L. Examination of 1908 or of any previous year by reason of deficiency in attendance at lectures, shall be entitled to the same privileges as the candidates referred to in the preceding paragraph, provided he makes up his deficiency in accordance with the existing Regulations.

(iii) In any year subsequent to 1912 no person shall be admitted to either the Preliminary or the Final Examination in Law, except in strict conformity with the new Regulations.

33. The M.L. Examination shall be held for the first time in accordance with the new Regulations in 1907.

34. The Examination for Honours in Law in 1906 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force. Any candidate who may pass at such Examination shall be entitled to the same privileges as if he had passed the M.L. Examination in the first class under the new Regulations.

35. Up to 1907 the Degree of Doctor of Law shall be conferred in accordance with the existing Regulations, and in and after 1908 in accordance with the new Regulations.

36. The Preliminary Scientific L.M.S. Examination in accordance with the existing Regulations and Rules shall be

held for the last time in 1907, and for this purpose those Regulations and Rules shall be deemed to be in force.

37. The First L.M.S. Examination in 1907, 1908 and 1909 (and in no subsequent year) shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

38. The Second L.M.S. Examination in 1907, 1908, 1909, 1910 and 1911 (and in no subsequent year) shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

39. Any candidate who fails in the Preliminary Scientific L.M.S. Examination in 1907 may appear at the Preliminary Scientific M.B. Examination in 1908 or 1909, provided he attends in an affiliated College a regular course of lectures for one academical year, in the subjects in which he has failed as also in the additional subjects in which he has not previously attended any lectures. If any such candidate attains the standard laid down in the new Regulations for the Preliminary Scientific M.B. Examination, he shall be declared to have passed that examination.

40. Any candidate who fails in the First L.M.S. Examination in 1909 may appear at the First M.B. Examination in 1910 or 1911, provided he attends in an affiliated College a regular course of lectures for one academical year, (i) in the subjects in which he has failed, (ii) in any additional subjects in which he has not previously attended any lectures, and (iii) in the subject of Zoology as prescribed for the Preliminary Scientific M.B. Examination under the new Regulations. If such candidate attains the standard laid down in the new Regulations for the First M.B. Examination and also passes an examination in Zoology in the standard of the Preliminary Scientific M.B. Examination, he shall be declared to have passed the First M.B. Examination.

41. Any candidate who fails in the Second L.M.S. Examination in 1911 may appear at the Second M.B. Examination in 1912 or 1913, provided he attends in an affiliated College a regular course of lectures for one academical year in the subjects in which he has failed. If such candidate attains the standard laid down in the new Regulations for the Second M.B. Examination (Parts I and II or Part II only, as the case may be), he shall be granted a certificate of having passed the Second L.M.S. Examination.

42. The Preliminary Scientific M.B. Examination shall be held for the first time in accordance with the new Regulations in 1908: Provided that at the Examinations held in 1909 and 1910 no one shall be admitted who has not passed the F.A.

Examination or the Intermediate in Arts or the Intermediate in Science.

43. The Preliminary Scientific M.B. Examination in 1907 and 1908 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

In 1908 there shall be two Examinations, one in accordance with the existing Regulations and the other in accordance with the new Regulations. For the latter no one shall be eligible who has not passed the F.A. Examination.

44. The First M.B. Examination shall be held for the first time in accordance with the new Regulations in 1910.

45. The First M.B. Examination in 1907, 1908 and 1909 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

46. The Final M.B. Examination shall be held for the first time in accordance with the new Regulations in 1913.

47. The Second M.B. Examination in 1907-1912 shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

48. The Examinations for Honours in Medicine, for the Degrees of Doctor of Medicine, Master of Surgery and Master of Obstetrics, and for the Diploma in Public Health, shall be held for the first time in accordance with the new Regulations in 1907.

49. The Examination for the Degree of Doctor of Medicine in 1906 shall be held in accordance with the existing Regulations, which, for this purpose, shall be deemed to be in force.

50. The Intermediate Examination in Engineering shall be held for the first time in accordance with the new Regulations in 1909.

51. In 1907, 1908 and 1909 the First Examination in Engineering shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

52. In 1910 and 1911, the First Examination in Engineering shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force:

Provided, however, that at the examination in either of these years, only the following classes of candidates shall be allowed to appear:—

- (a) Candidates who have failed at any previous F.E. Examination.

- (b) Candidates who have not passed any examination higher than the Entrance or Matriculation Examination.

53. Any candidate who fails at the F.E. Examination in 1911 may be admitted to the Intermediate Examination in Engineering in 1912 or 1913.

54. Any person who passes or has passed the F.E. Examination shall be deemed qualified for admission to University Examinations in the same manner as if he had passed the Intermediate Examination in Engineering in accordance with the new Regulations.

55. The B.E. Examination shall be held for the first time in accordance with the new Regulations in 1911.

56. The B.E. Examination in 1907, 1908, 1909 and 1910 and the L.E. Examination in 1907-1912, shall be held in accordance with the existing Regulations and Rules, which, for this purpose, shall be deemed to be in force.

57. The Examination for Honours in Engineering shall be held for the last time in 1907, in accordance with the existing Regulations, which, for this purpose, shall be deemed to be in force.

58. Up to 1909 the Degree of Master in Engineering shall be conferred in accordance with the existing Regulations, which, for this purpose, shall be deemed to be in force.

59. The Degree of Doctor of Science (Engineering) may be conferred in 1907 in accordance with the new Regulations.

60. The Examination for Licentiate in Teaching and Bachelor of Teaching shall be held for the first time in 1908.

61. As soon as practicable after the commencement of the new Regulations, the Syndicate shall frame, subject to the approval of the Senate:—

- (a) A revised body of Rules for the conduct of the examinations which, according to the preceding Regulations, have to be held in accordance with the existing Regulations; and
- (b) A body of Rules for the conduct of the examinations to be held in accordance with the new Regulations:

Provided that nothing in the Rules made under (a) shall contravene the existing Regulations, and nothing in the Rules made under (b) shall contravene the new Regulations.

62. Nothing in the Regulations contained in this chapter shall be deemed to prohibit any alteration in the existing



Regulations and Rules, provided such alteration is made by the Body competent in that behalf, and in the manner prescribed by the new Regulations.

63. Within eight weeks from the date when these Regulations come into force the Principal of every affiliated College shall forward to the Registrar the name of every student on the rolls of the College, together with the registration fee of Rs. 2 required for matriculation by Regulation 6 of Chapter XV. The Registrar shall, upon receipt of the fee, enter the name of every such student on the Register of University Students.

64. In any case not covered by the preceding Regulations of this chapter, the Syndicate shall give such directions as may be justified by the special circumstances of the case.

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## CHAPTER XXX

### MATRICULATION EXAMINATION.

1. The Matriculation Examination shall be held annually in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the date to be duly notified.

2. (i) Ordinarily, only pupils who have been educated for at least one school year previous to the date of the Matriculation Examination at a school, recognised by the Calcutta University for such purpose, shall be admitted to the Matriculation Examination.

(ii) Candidates who have not attended any school for at least one year previous to the Examination, may also be admitted to the Examination as private candidates, and the following procedure shall apply in their cases:—

(a) All such candidates shall submit their applications to the Divisional Inspector of Schools, on or before a date to be fixed by the Syndicate in this behalf; such candidates in submitting their applications to the Inspector of Schools, shall produce satisfactory evidence that they have prosecuted a regular course of study and have been subject to proper discipline.

(b) In the cases of candidates who are able to produce evidence to his satisfaction that they have prosecuted a regular course of study and have been subject to proper discipline, the Inspector of Schools shall arrange for their appearance at the Test Examination of a recognised school or at a special Test Examination to be held by him for this purpose.

(c) The Inspector of Schools shall submit to the Registrar, in such forms as may, from time to time, be prescribed by the Syndicate in this behalf and on or before such dates as may be fixed by the Syndicate. lists of candidates—

- (1) who have been permitted by the Inspector to appear at the Test Examination under (b) above; and
- (2) who have not been granted permission to appear at the Test Examination, recording in each case the reason for the refusal of permission.

The Inspector of Schools shall inform the candidates concerned accordingly.

(iii) Private girl candidates need not appear at a Test Examination. But girl candidates will not be entitled to appear as

private candidates if they have read in any recognised school one year previous to the Examination.

These provisions shall not take away the power of the Syndicate to deal with special cases in such way as it thinks proper.

3. The application of every candidate sent up for the Matriculation Examination must be accompanied by a certificate in one of the forms prescribed by the Syndicate.

4. The Head Masters of recognised schools shall submit to the Controller of Examinations within such date as may be prescribed by the Syndicate, the applications of those pupils and private candidates who have passed the Test Examination together with the necessary fees prescribed in Regulation 5.

In cases of private candidates where the Inspector of Schools has held a Test Examination, the applications of candidates who have passed the Examination shall similarly be forwarded, together with the necessary fees, by the Inspector of Schools.

The applications of private girl candidates for admission to the Matriculation Examination will be submitted to the Controller of Examinations in the prescribed form with necessary fees within such date as may be prescribed by the Syndicate.

5. A fee of fifteen rupees shall be forwarded by each candidate with his application. A candidate, who fails to pass or to present himself for the Examination, shall not be entitled to claim a refund of the fee. He may be admitted to one or more subsequent Matriculation Examinations, subject to the conditions laid down in these regulations.

Provided that if a candidate who has passed the Matriculation Examination and is prosecuting his studies for a higher examination in a College affiliated to this University, is required by the University to appear in a special subject at the Matriculation Examination, he shall pay a reduced fee of Rs. 8 only.

6. The Matriculation Examination shall be conducted by means of printed papers, the same papers being used at every place at which the Examination is held. All papers other than those on a Vernacular shall be set in the English language.

7. (1) The Matriculation Examination shall be a general test of fitness for admission to the University of Calcutta.

(2) Unless otherwise provided answer-papers in all subjects other than English and other European languages shall be written in one or other of the Major Vernaculars, *viz.*, Bengali, Urdu, Assamese and Hindi.

Provided that—

(a) the Syndicate may in special cases or class of cases including schools and individuals make exceptions to this rule or postpone its operation either in whole or in part for a prescribed time;

(b) candidates, whose Vernacular is a language other than a Major Vernacular, shall have the option of writing their answers in all papers other than the Vernacular paper, if any, either in English or in one of the Major Vernaculars and they shall state in their application form the language chosen;

(c) whenever the Managing Committee or any other authority of a recognised school outside Bengal or in the District of Darjeeling or in the Chittagong Hill Tracts applies to the effect that the pupils of such a school should be exempted from the necessity of writing their answers in any of the Major Vernaculars recognised for the purpose by the University, the Syndicate shall exempt them for a specified period or periods from the operation of the general rule and permit them to give their answers in all subjects other than the Vernacular, if any, in English instead.

8. Candidates for the Matriculation Examination shall be examined in the following subjects:—

- |  |                               |
|--|-------------------------------|
| (1) A Major Vernacular Language, viz.,<br>Bengali, Urdu, Assamese or Hindi   | ... Two papers.               |
| (2) English  | ... Two papers<br>and a half. |
| (3) Geography  | ... Half paper.               |
| (4) History of India and History of England  | ... One paper.                |
| (5) Mathematics  | ... One paper.                |
| (6) A Classical Language (viz., Sanskrit, Pali, Arabic, Persian, Greek, Latin, Classical Armenian, Hebrew, Syriac or Classical Tibetan); |                               |

or

- \* An Indian Vernacular recognised by the Syndicate, from time to time, other than the Vernacular of the candidate already taken up as a compulsory subject;

or

A modern European Language other than English (viz., French, German, Italian or Portuguese) One paper.

- (7) Elementary Scientific Knowledge ... One paper.

Provided that Elementary Scientific Knowledge shall not be regarded as a compulsory subject for three years from the year in which the first Matriculation Examination will be held under the new Regulations. During the period of transition Elementary Scientific Knowledge shall be included in the list of optional subjects stated below.

\* The following Vernaculars have been recognised by the Syndicate: Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurumukhi).

**\* (8) Candidates who have taken up a Major Vernacular may, if they so desire, take up one of the following subjects:—**

- (a) Elementary Scientific Knowledge, subject to the above proviso.
- (b) Elements of Physics and Chemistry.
- (c) Mensuration and Surveying.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Drawing and Painting including an appreciation of Fine Arts

(One paper each).

If the Vernacular of a candidate is a language other than a Major Vernacular he shall take up in lieu of the two papers on the Vernacular, two papers on any two subjects out of the following:—

- (a) A Classical Language, if not taken under 8 (6)

or

† An Indian Vernacular, other than the Indian Vernacular, if any, taken under 8 (6).

- (b) Elementary Scientific Knowledge, subject to the proviso above.
- (c) Elements of Physics and Chemistry.
- (d) Mensuration and Surveying.
- (e) Elementary Mechanics.
- (f) Elementary Hygiene.
- (g) Elements of Biology.
- (h) Additional Mathematics.
- (i) Business Method and Correspondence.
- (j) Commercial Geography.

\* No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

*Note.*—Candidates who take up Mathematics and Science subjects must be familiar with technical terms in the English language, which fall within the prescribed syllabus.

† The following Vernaculars have been recognised by the Syndicate : Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurumukhi).

- (k) Elements of Public Administration in India.
- (l) Additional English.
- (m) Drawing and Painting including an appreciation of Fine Arts.

*(One paper each).*

He may, if he so desires, take up an additional third subject out of the subjects specified above.

9. Notwithstanding anything stated above girl candidates shall be examined in the following subjects:—

- |  |   |                  |
|--|---|------------------|
| <ul style="list-style-type: none"> <li>(1) A Major Vernacular Language,</li> <li>(2) English,</li> <li>(3) Geography,</li> <li>(4) History of India and History of England,</li> <li>(5) Mathematics or</li> </ul> | } | as in Section 8. |
|--|---|------------------|

Arithmetic and Domestic Science including  
Domestic Hygiene                      ...                      ... *One paper.*

\* (6) At least one but not more than two until Elementary Scientific Knowledge is made compulsory for boys and thereafter at least two but not more than three of the following:—

- (a) One of the languages mentioned in sub-section (6) of Section 8.
- (b) Elementary Scientific Knowledge.
- (c) Elements of Physics and Chemistry.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Sewing and Needlework.
- (l) Music.
- (m) Drawing and Painting including an appreciation of Fine Arts.

*(One paper each).*

\* No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

If the Vernacular of a girl candidate is a language other than a Major Vernacular, she shall be examined in the following subjects:—

- |  |                    |
|--|--------------------|
| (1) English,                                 | } as in Section 8. |
| (2) Geography,                               |                    |
| (3) History of India and History of England, |                    |
| (4) Mathematics or                           |                    |

Arithmetic and Domestic Science including Domestic Hygiene ... *One paper.*

(5) A Classical Language (*viz.*, Sanskrit, Pali, Arabic, Persian, Greek, Latin, Classical Armenian, Hebrew, Syriac or Classical Tibetan)

or

\* An Indian Vernacular recognised by the Syndicate from time to time

or

A modern European Language other than English (*viz.*, French, German, Italian or Portuguese) *One paper.*

† (6) At least two but not more than three until Elementary Scientific Knowledge is made compulsory and thereafter at least three but not more than four of the following:—

- (a) A Classical Language other than the Indian Vernacular, if any, taken under 9 (5).
- (b) Elementary Scientific Knowledge.
- (c) Elements of Physics and Chemistry.
- (d) Elementary Mechanics.
- (e) Elementary Hygiene.
- (f) Elements of Biology.
- (g) Additional Mathematics.
- (h) Business Method and Correspondence.
- (i) Commercial Geography.
- (j) Elements of Public Administration in India.
- (k) Additional English.

\* The following Vernaculars have been recognised by the Syndicate: Bengali, Hindi, Uriya, Assamese, Urdu, Khasi, Nepali, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Garo, Manipuri, Lushai, Modern Tibetan, Modern Armenian, Sindhi, Sinhalese, Santali and Panjabi (Gurmukhi).

† No school will be allowed to teach any subject involving lectures which should be experimentally illustrated or involving the pupils themselves doing practical experimental work unless the Syndicate is satisfied that adequate arrangements have been made for the purpose.

- (l) Sewing and Needlework.
- (m) Music.
- (n) Drawing and Painting including an appreciation of Fine Arts.

(One paper each).

No girl candidate shall be allowed to take up Mathematics or Physics or Chemistry as a subject for the Intermediate Examination unless she has already passed the Matriculation Examination with Mathematics as one of her subjects.

10. Each paper shall be of three hours and shall carry 100 marks. Each half paper shall be of an hour and a half and shall carry 50 marks.

11. As soon as possible after the Examination the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions each in alphabetical order. Every successful candidate shall receive a certificate in the prescribed form.

12. The limits of the subjects are defined hereafter, and books shall be prescribed or recommended by the Syndicate, whenever necessary, to indicate the standard and extent of knowledge required in the different subjects.

## I

### A MAJOR VERNACULAR LANGUAGE

(Bengali, Urdu, Assamese or Hindi)

1. The course in a Major Vernacular Language shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which pupils will be expected to have read.

2. Questions shall be set under the following heads:—

- (a) Passages from prescribed texts;
- (b) Grammar and Composition;
- (c) Translation from English into one of the recognised Vernaculars;
- (d) Essays.



3. Candidates may be asked to explain, summarise and paraphrase the passages set or to answer any question thereon which will test their understanding of the meaning or the construction of the passages. Questions shall not be set on the History of Language or Literature of the Vernacular.

4. The head " Grammar and Composition " shall include (a) questions involving the practical applications of the rules of grammar, (b) questions on the right use of words and phrases, and (c) exercises in composition.

5. Candidates will be required to write two essays one of which will be taken from books of general interest prescribed for rapid reading. Detailed knowledge of the contents of the books will not be required.

6. The distribution of the heads and marks in the two papers shall be as follows:—

<i>Paper I</i>	...	...	100 marks.
----------------	-----	-----	------------

Questions on the subject-matter and on the language of the prescribed texts:

Prose text	...	...	60 marks.
Poetry text	...	...	40 marks.

<i>Paper II</i>	...	...	100 marks.
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(a) Grammar and Composition	...	25 marks.
(b) Translation from English into the Vernacular	25 marks.	
(c) Essays	...	50 marks.

## II

### ENGLISH

1. (i) The Matriculation Examination in English shall be a test (a) of ability to write clear, simple and correct English and (b) of intelligent comprehension of plain modern English on familiar subjects.

(ii) The course in English shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English. The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books as showing the standard up to which pupils will be expected to have read.

(iii) The second paper in English shall include passages in one of the following Vernaculars for translation into English:—

Bengali, Urdu, Assamese, Hindi, Khasi, Garo, Manipuri, Nepali or Modern Tibetan.

The Syndicate shall have power to add to this list.\*

2. Candidates may be asked to explain, summarise or paraphrase the passages set or to answer any question thereon which will test their understanding of the meaning or the construction of the passages. Questions shall not be set on the History of the English Language or Literature.

3. Under the head "Grammar" no formal definitions will be asked, but the questions will relate only to (a) practical applications of the rules of grammar, and (b) the right use of words and phrases.

4. Passages for translation may be narrative or descriptive or may consist of simple conversation on ordinary subjects. They must be such as may be easily rendered from one language into the other; they shall, where possible, be taken from recognised authors; and they shall not consist of any translation made for the purpose of the Examination from English into Vernacular.

5. For the purpose of Paper III (Half-paper) certain books of general interest written in simple English will be prescribed for rapid reading. The questions will be of a general character which may be answered from the prescribed books and will be set to test the candidates' power to write simple English. A large number of alternative questions will be allowed, and no detailed knowledge of the contents of the books will be required.

6. The distribution of the heads and of marks in the papers shall be as follows:—

<i>Paper I</i>	...	... 100 marks.
(a) Questions on the subject-matter and the language of the prescribed Prose Text	...	75 marks.
(b) Grammar	...	25 marks.
<i>Paper II</i>	...	... 100 marks.
(a) Questions on the subject-matter and the language of the prescribed Poetry Text	...	50 marks.

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\* The following languages have been added to the list by the Syndicate: Santali, Uriya, Telugu, Marathi, Gujarathi, Maithili, Tamil, Kanarese, Malayalam, Lushai, Modern Armenian, Sinhalese, Sindhi and Panjabi (Gurumukhi).

*(b) Translation from one of the recognised Vernaculars into English (two passages shall be set, of which one must be attempted)	... 20 marks.
(c) Letter-writing on simple topics	... 15 marks.
(d) Précis or substance writing	... 15 marks.
<i>Paper III (Half-paper)</i>	... 50 marks.

General questions from prescribed books as in (5).

### III

#### GEOGRAPHY

The course in Geography shall include the rudiments of General and Physical Geography together with the Geography of India in fuller details.

1. The earth's shape—rotation and revolution—day and night. Divisions of the earth's surface; latitude and longitude. Land forms and the action of the climatic forces upon them. Work of air, rain, rivers, oceans and glaciers on the earth's crust. Formation of soil.

The general relief of the globe, *i.e.*, the great slopes of the world as forming the continental water-partings and deciding the general distribution of rainfall.

The great oceans of the world and their relation to the great water-partings; winds and tides.

2. Outlines of the Geography of the world.

3. Geography of India in greater details than in 2 and including the following:—

Natural regions and surface features; climate; vegetation; animal life; distribution of minerals of economic importance; industries; population; and means of communication.

4. The drawing of simple plans and maps. Observations of temperature, rainfall and the direction of the wind.

Every recognised school must possess necessary apparatus for undertaking instruction in Geography. The list of apparatus

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\* *Note.*—For pupils whose Vernacular is English or is one not recognised, alternative questions shall be set on English Composition or Unseen passages or Essay.

required will be drawn up, from time to time, by the Syndicate on the recommendation of the Board of Studies in Geography

Total number of marks in Geography ... 50 marks.

#### IV

### HISTORY OF INDIA AND HISTORY OF ENGLAND

#### (A) HISTORY OF INDIA

The course shall include a Reader on Indian History with special reference to North-Eastern India including a short account of the administration of British India and of the progress of India under British rule. The course shall include the following:—

##### Ancient Period

The physical features of India.

Peoples and languages.

The fundamental unity of Indian civilisation.

Pre-historic India and Indus civilisation.

Vedic India—The Aryans, their immigration and early settlements, literature, religion, political and social organisation.

Post-Vedic India—Up to 325 B.C.—The spread of Aryan civilisation to the Ganges valley and the Deccan; the beginnings of Epic poetry—the rise of Jainism and Buddhism—Kingdoms and Republics preceding the Mauryas. The Persian and Macedonian invasions.

The Maurya Empire—Chandragupta—Asoka—the four Tamil Kingdoms—Political and Social Organisation of Maurya India.

The successors of the Imperial Mauryas in North-East India and the Deccan—the Satavahana Empire—the Kushan Empire—the Vikrama and Saka Eras.

The Gupta Empire—Samudragupta—the Vikramadityas—Fa Hien—Civilisation of the Gupta Age—the Huns and Yasodharman—Sasanka.

The Empire of Harsa—Hiuen Tsang—the decline of Kanauj—the Chalukya Empire in the South.

The Pala Empire in North-East India.

The Sena Kings of Bengal—the Muslim Conquest.

The colonial and maritime enterprise of the ancient Hindus.  
Hindu Civilisation.

## Mediaeval Period

Early Muslim Invasions.

The Early Turki Sultanate of Delhi.

The Khiliji Sultans.

The Tuglaks—Ibn Batuta—the Invasion of Timur.

The break-up of the Sultanate of Delhi—Independent Kingdoms of Northern India and the Deccan.

Bengal from the fall of the Sena Kings to the Mughal Conquest.

Religious and Cultural History up to the accession of Akbar.

Afghan-Mughal contest for empire in Hindusthan—the Lodis, Babar, Humayun, Sher Shah, Bairam Khan.

The Mughal Empire under Akbar—Policy of religious toleration.

Jahangir.

Shah Jahan—The Taj Mahal.

Aurangzib—the Rajput Revolt and the rise of the Marathas—Sivaji.

The break-up of the Mughal Empire and the ascendancy of the Marathas—Invasions of Nadir Shah and Ahmad Shah Durrani.

Condition of India under the Mughals.

Europeans in India, the Portuguese, the Dutch, the English, the French and other nations.

The Marathas, the Sikhs. Mysore.

The Nawabs of Murshidabad.

## Modern Period

The consolidation of British Power in Bengal and the Carnatic—the Conflict between the French and the English for supremacy in India.

The administrative reforms of Hastings and Cornwallis.

The Anglo-Maratha struggle for empire and the fall of the Mysore Sultanate—the Nepal War—Wellesley to Lord Hastings.

British expansion beyond the Brahmaputra and the Sutlej—Amherst to Dalhousie.

Social reform and educational progress—Bentinck to Dalhousie.

The Mutiny and the Settlement of 1858. The Queen's Proclamation.

Canning to Lytton.

Afghan policy and the annexation of Burma.

The first era of constitutional reforms—Ripon—Local Self-Government—Freedom of the Press—Legislative Councils—growth of Indian Nationalism.

Lansdowne and Curzon.

The second era of constitutional reforms—Partition of Bengal and its consequences—The Morley-Minto Reforms, the Delhi Durbar, the Montagu-Chelmsford Reforms. The Government of India Act, 1935.

The present administration of India—Its evolution.

Educational progress in India under British Rule.

Economic and material development under British Rule.

Further constitutional progress.

## (B) HISTORY OF ENGLAND

1. The Mingling of the Races (down to the Norman Conquest).

The Romans, Saxons, Danes, Christianity in England, Victory of Christianity from Rome. The struggles of the Kingdoms and the consolidation of Britain. The contributions of Wessex and Alfred.

2. The Making of the Nation.

The Norman Conquest, its invigorating effect. Feudalism. The struggle between Church and State. The Crusades and their consequences. Struggle against the tyranny of the Crown. The Magna Charta. Attempts to bring Scotland and Wales into union with England. The Hundred Years' War with France. The Black Death and its effects. The Administration of Justice. The Growth of Parliament. The War of the Roses and the struggle for the Throne.

3. Decay of Feudalism. The Tudor Age.

Absolutism of the Tudors. The Renaissance and the Reformation. The New World. Development of commerce and sea-power. The rupture with Rome and the struggle between the Old and the New Religions. Policy of Elizabeth at home and abroad. The Religious Settlement. The Counter-Reformation. The war with Spain. The beginnings of the Empire. The Landmarks in the literature of the age. The Bible.

4. The Stuarts. The struggle for Liberty.

Growth of power of Parliament. The quarrel between Crown and Parliament. The Protectorate: its failure. The Restoration. Colonies and Maritime War. The expansion of the Empire. James II and the Revolution of 1688. The Bill of Rights. Union between England and Scotland. The war against France. The Supremacy of England in commerce and on the seas. Landmarks in Arts, Science, and Literature.

5. The German Kings. From Utrecht to Waterloo.

Whigs and Tories. Cabinet Government. Expansion of the Empire: war, exploration, commerce. The struggle with France, empire in America and India. Revolt of the American Colonies. The French Revolution: its effects. War with

Revolutionary France and Napoleon. The Industrial Revolution. Industry, commerce and transport at the beginning of the XIXth century. Religious movements. Abolition of Slavery.

6. From Waterloo to the present.

Growth of the democratic movement. Religious toleration. The Reform Bill of 1832. Rise of the Conservatives. Free Trade. Political development in England under Victoria. Expansion of the Empire. The establishment of the British Power in India. Sepoy Mutiny and transfer of the administration of India from the East India Company to the Crown. England and her Colonies. The Dominions and Self-Government. The Great War. Landmarks in Arts, Literature, Science. The present political constitution in Britain and India. The relation between the constituent parts of the British Commonwealth. The League of Nations.

The marks shall be distributed as follows:—

History of India	...	...	60 marks.
History of England	...	...	40 marks.

## V

### MATHEMATICS

The course in Mathematics shall include Arithmetic, Algebra and Plane Geometry. The marks shall be divided as follows:—

Arithmetic	...	...	35 marks.
Algebra	...	...	30 marks.
Plane Geometry	...	...	35 marks.

(a) *Arithmetic*:—The four Simple Rules, Vulgar and Decimal Fractions, Reductions, Extraction of Square Root, Practice, Proportion, Simple Interest, Present Worth, Discount, Stocks and Shares. Problems more easily solvable by Algebra should not be required to be solved arithmetically.

(b) *Algebra*:—The four Simple Rules, Proportion, Simple Equations, Resolution into Factors, Greatest Common Measure, Least Common Multiple, Graphs of Simple Equations.

(c) *Plane Geometry*:—

### PRACTICAL.

Bisection of angles and of straight lines.

Construction of perpendiculars to straight lines.

Construction of an angle equal to a given angle.

Construction of parallels to a given straight line.

Construction of triangles with given parts.

Division of a straight line into a given number of equal parts.

Construction of a parallelogram equal to a given triangle and having one of its angles equal to a given angle.

Construction of a triangle equal in area to a given rectilineal figure.

Construction of a tangent to a circle.

Easy extensions of these constructions may be given as problems.

Candidates may be required to give the reasons for any particular construction involved in any question.

*Every candidate is required to provide himself with the following :—A hard pencil, dividers, pencil compasses and a straight ruler showing centimetres and inches.*

## THEORETICAL

### *Angles at a Point*

If a straight line stands on another straight line, the sum of the two angles so formed is equal to two right angles and the converse.

If two straight lines intersect the vertically opposite angles are equal.

### *Parallel Straight Lines*

If a straight line, cutting two other straight lines, makes—

- (i) the alternate angles equal,
- (ii) two corresponding angles equal,
- (iii) the interior angles on the same side of the line supplementary,

then the two straight lines are parallel, and the converse.

Straight lines which are parallel to the same straight line are parallel to one another.

### *Triangles and Rectilineal Figures*

The sum of the angles of a triangle is equal to two right angles.



If the sides of a convex polygon are produced in order, the sum of the angles so formed is equal to four right angles.

Two triangles are equal in every respect—

(i) if two sides and the included angle of one triangle are respectively equal to two sides and the included angle of the other;

(ii) if two angles and a side of the one triangle are respectively equal to two angles and the corresponding side of the other.

If two sides of a triangle are equal, the angles opposite to the sides are equal and the converse.

Two triangles are equal in every respect, if the three sides of one triangle are respectively equal to the three sides of the other.

Two right-angled triangles are equal in every respect, if they have their hypotenuses equal and one side of the one equal to one side of the other.

If two sides of a triangle are unequal the greater side has the greater angle opposite to it and the converse.

Any two sides of a triangle are together greater than the third.

Of all the straight lines that can be drawn to a given straight line from a given point outside it the perpendicular is the shortest.

The opposite sides and angles of a parallelogram are equal; each diagonal bisects the parallelogram and the diagonals bisect one another.

If there are three or more parallel straight lines and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercepts on any other straight line that cuts them are equal.

### *Areas*

Parallelograms on the same or equal bases and of the same altitude are equal in area.

Triangles on the same or equal bases and of the same altitude are equal in area.

Equal triangles on the same or equal bases are of the same altitude.

Illustrations and explanations of the geometrical theorems corresponding to the following algebraical identities:—

$$k(a+b+c.....)=ka+kb+kc+.....$$

$$k(a+b+c.....)$$

$$(a+b)^2=a(a+b)+b(a+b).$$

$$a(a+b)=a^2+ab.$$

$$(a+b)^2=a^2+2ab+b^2.$$

$$(a-b)^2=a^2-2ab+b^2$$

$$a^2-b^2=(a+b)(a-b).$$

The square on a side of a triangle is greater than, equal to, or less than, the sum of the squares on the other two sides, according as the angle contained by those sides is obtuse, right or acute. The difference in the cases of inequality is twice the rectangle contained by one of the two sides and the projection on it of the other.

### *Loci*

The locus of a point which is equidistant from two fixed points is the perpendicular bisector of the straight line joining the two fixed points.

The locus of a point which is equidistant from two intersecting straight lines consists of the pair of straight lines which bisect the angles between the two given lines.

### *The Circle*

A straight line drawn from the centre of a circle to bisect a chord, which is not a diameter, is at right angles to the chord; conversely, the perpendicular to a chord from the centre bisects the chord.

There is one circle, and one only, which passes through three given points not in a straight line.

In equal circles (or in the same circle) (i) if two chords subtend equal angles at the centre, they are equal; (ii) conversely, if two arcs are equal, they subtend equal angles at the centre.

In equal circles (or in the same circle) (i) if two chords are equal, they cut off equal arcs; (ii) conversely, if two arcs are equal, the chords of the arcs are equal.

Equal chords of a circle are equidistant from the centre, and the converse.

The tangent at any point of a circle is perpendicular to the radius through the point.

If two tangents are drawn to a circle from an external point (i) they are equal, (ii) they subtend equal angles at the centre of the circle.

If two circles touch, the point of contact lies on the straight line through the centres.

The angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.

Angles in the same segment of a circle are equal; and if the line joining two points subtends equal angles at two other points on the same side of it, the four points lie on a circle.

The angle in a semicircle is a right angle; the angle in a segment greater than a semicircle is less than a right angle; and the angle in a segment less than a semicircle is greater than a right angle.

The opposite angles of any quadrilateral inscribed in a circle are supplementary and the converse.

If a straight line touch a circle and from the point of contact a chord be drawn, the angles which this chord makes with the tangent are equal to the angles in the alternate segments.

If two chords of a circle intersect either inside or outside the circle, the rectangle contained by the parts of the one is equal to the rectangle contained by the parts of the other.

#### *On the Concurrence of Straight Lines in a Triangle*

(i) The perpendiculars drawn to the sides of a triangle from their middle points are concurrent.

(ii) The bisectors of the angles of a triangle are concurrent.

(iii) The medians of a triangle are concurrent.

(iv) The perpendiculars from the vertices of a triangle to the opposite sides are concurrent.

Each question on the theoretical Geometry shall consist of a theorem contained in the above schedule together with an easy deduction.

Any proof of a proposition shall be accepted, which appears to the Examiners to form part of a systematic treatment of the subject, but proofs of theorems should, as far as possible, be based on first principles. The order in which the theorems are stated in the above schedule is not to be regarded as essential.

In the proof of theorems and deductions from them, it shall be permissible to use hypothetical constructions.

The ordinary symbolical abbreviations may be used.

## VI

### A CLASSICAL LANGUAGE

#### (A) SANSKRIT

1. The course in Sanskrit shall include simple pieces in prose and verse, selected from standard works in Classical

Sanskrit, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.

2. A book of elementary Sanskrit Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Sanskrit shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Sanskrit or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Sanskrit. Such sentences shall, in no case, be translations of portions of the prescribed texts 20 marks.

#### (B) PALI

1. The course in Pali shall include simple pieces in prose and poetry, selected from early standard works in Pali literature, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.

2. Grammars will be recommended from time to time.

3. The marks in the paper in Pali shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Pali or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving practical use of the elementary rules of Grammar including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Pali. Such sentences shall, in no case, be translations of portions of the prescribed texts 20 marks.

## (C) ARABIC

1. The course in Arabic shall include pieces in prose and verse, selected from standard works in Classical and Modern Arabic, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. A book of Elementary Arabic Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Arabic shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Arabic or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Arabic. Such sentences shall, in no case, be translations of portions of the prescribed texts 20 marks.

## (D) PERSIAN

1. The course in Persian shall include simple pieces in prose and verse, selected from standard works in Classical and Modern Persian, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. A book of Elementary Persian Grammar shall also be prepared and prescribed by the University.

3. The marks in the paper in Persian shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English or into one of the Major Vernaculars as well as for explanation, either in Persian or in a Major Vernacular, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks..

- (iii) Translation of simple sentences from English into Persian. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

### (E) GREEK

1. The course in Greek shall consist of portions in prose and verse from suitable easy standard Attic writers and of easy portions of the New Testament, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Greek shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Greek. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

### (F) LATIN

1. The course in Latin shall consist of portions in prose and verse from suitable easy standard authors. The course shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Latin shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Latin. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

## (G) CLASSICAL ARMENIAN

1. The course in Classical Armenian shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. Books on Grammar will be recommended from time to time.

3. The marks in the paper in Classical Armenian shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Classical Armenian. Such sentences shall, in no case, be translations of portions of the prescribed texts ... 20 marks.

## (H) HEBREW

1. The course in Hebrew shall include selections from easy portions of the Old Testament, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper in Hebrew shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Hebrew. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

## (I) SYRIAC

1. The course in Syriac shall include selections from the Peshitto Version of the New Testament and from some non-

official authors, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in Syriac shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Syriac. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

#### (J) CLASSICAL TIBETAN

1. The course in Classical Tibetan shall include simple pieces in prose and verse, selected from standard works in Tibetan literature, to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. Books on Grammar will be recommended from time to time.

3. The marks in the paper in Classical Tibetan shall be distributed as follows:—

- (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks ... 60 marks.
- (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction ... 20 marks.
- (iii) Translation of simple sentences from English into Tibetan. Such sentences shall, in no case, be translations of portions of the prescribed texts. 20 marks.

#### (K) AN INDIAN VERNACULAR

1. The course in an Indian Vernacular shall include selections in prose and verse from the writings of standard authors, to be prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies concerned.



## 2. The marks shall be distributed as follows:—

- |   |     |     |           |
|---|-----|-----|-----------|
| (i) Questions on the subject-matter and language of the prescribed text | ... | ... | 50 marks. |
| (ii) Questions on Grammar and Composition                               |     |     | 20 marks. |
| (iii) Essay   | ... | ... | 30 marks. |

The Essay will be set from books of general interest prescribed for rapid reading.

No detailed knowledge of the contents of the books will be required.

## (L) A MODERN EUROPEAN LANGUAGE OTHER THAN ENGLISH

*(French, German, Italian or Portuguese)*

1. The course shall consist of portions in prose and verse from standard writers of the language concerned. The course shall include select texts to be prescribed by the Syndicate, from time to time, on the recommendation of the Board of Studies concerned.

2. The marks in the paper shall be distributed as follows:—

- |   |     |     |           |
|---|-----|-----|-----------|
| (i) Passages from the prescribed texts for translation into English, together with questions on the subject-matter of the texts. Under this head, translation from text shall, in no case, carry more than 20 marks | ... | ... | 60 marks. |
| (ii) Questions involving the practical use of the elementary rules of Grammar, including passages containing grammatical errors for correction  |     | ... | 20 marks. |
| (iii) Translation of simple sentences from English into the language concerned. Such sentences shall, in no case, be translations of portions of the prescribed texts   | ... | ... | 20 marks. |

## VII

## ELEMENTARY SCIENTIFIC KNOWLEDGE

1. Observation and identification of the principal constellations, major stars and planets throughout the year at night. The Sun—its dimension and distance from the Earth. Planetary system—relative positions. Solar year and seasons. The

Moon and its phases—lunar year. Eclipses of Sun and Moon. Comets and meteors.

2. The Earth—condensation from a hot gaseous state—its crust—igneous and sedimentary rocks. Probable condition of the interior of the Earth. Earth movements (earthquake)—folding, landslide, volcano. Varieties of soil and their bearing on plant-life and agricultural operations. The story of the formation of coal and mineral oil.

3. Structure of any common flowering plant. Functions of root, stem, leaf, flower and fruit. Special characteristics of the living—locomotion, respiration, nutrition, growth, response to stimulus, propagation and death; adaptation to environments. Examples from plants like rice and pea, and animals like earth-worm and fish. Life-history of (a) rice and pea and (b) ant, bee, spider, mosquito, butterfly and frog. Interdependence of plants and animals.

4. Simple consideration of the Human Body, and its principal systems, *viz.*, circulatory, respiratory and digestive systems. Foods—their relative values and their essential ingredients. Functions of the skin and nerves.

5. The three states of matter. Physical properties of air and water. Buoyancy and Archimedes' principle. Pressure of atmosphere. Effect of heat on water. Effect of heat on air. Ventilation. Effect of heat on solid bodies. Pendulum Clock and Thermometer. Transference of heat. Simple ideas regarding energy and its transformations with examples. Rectilineal propagation of light. Phenomena of reflection and refraction of light, colour and rainbow. Lodestone, magnetisation, terrestrial magnetism and compass. Simple Electric Cell. Conductors and insulators. Effects of current: (a) heating and lighting, (b) chemical, (c) magnetic. Electro-magnet and Electric Bell. Telegraphy.

6. Separation of Mixtures—solution, filtration, crystallisation, distillation, sublimation. Rusting of iron and burning of candle, magnesium and sulphur in a closed volume of air over water. Air, its composition. Properties of Oxygen, Nitrogen and Carbondioxide. Water, its composition. Properties of Hydrogen. Natural and aerated waters. Properties of hard and soft water. Characteristics of chemical compounds.

Candidates will be expected to have had a training in observation and in accurate and clear description, with reference to their practical applications and phenomena as observed in daily life. No detailed technical knowledge will be required.

Questions should be distributed over different portions of the syllabus and should be sufficiently varied and numerous to allow considerable option.

## VIII

## ELEMENTS OF PHYSICS AND CHEMISTRY

## (A) PHYSICS

1. (1) Matter and its three states; (2) measurements of length, angle, time, area, volume; (3) velocity, acceleration and force; (4) mass, work and weight; (5) the balance, density; (6) principle of Archimedes; (7) pressure of air; (8) simple barometer; (9) energy and conservation of energy.

2. Heat—(1) Expansion of solids, liquids and gases; (2) temperature; (3) thermometers; (4) melting and boiling points; (5) conduction; (6) convection; (7) radiation; (8) specific heat; (9) change of state; (10) mechanical equivalent of heat.

3. Sound—(1) Nature of sound; (2) its production and transmission.

4. Light—(1) Rectilinear propagation of light; (2) illumination; (3) laws of reflection and formation of images with plane, concave and convex mirrors; (4) refraction; (5) use of concave and convex lenses; prisms and their action on white light; (7) colour; (8) rainbow.

5. Magnetism—(1) Attraction and repulsion; (2) natural and artificial magnets; (3) terrestrial magnetism; (4) magnetic meridian; (5) the compass.

6. Electricity—(1) Electrification by friction; (2) positive and negative electricity; (3) properties of a charged body; (4) conductors and insulators; (5) the electroscope; (6) induction; (7) the electrophorus; (8) simple voltaic cells; (9) magnetic and heating effect of a current; (10) electromagnets; (11) the simple galvanoscope; (12) simple explanation of telegraphy; (13) electric bell; (14) electric light; (15) telephones; and (16) simple explanation of thunder and lightning.

*N.B.*—The course should be treated in an elementary manner and should be fully illustrated by suitable experiments. Records of demonstration shall be kept by students for inspection.

## (B) CHEMISTRY

1. (1) Scope of Chemistry; (2) elements and compounds, mechanical mixture; solutions; (3) filtration, crystallisation, distillation, sublimation; (4) states of matter; (5) melting and boiling points.

2. (a) Chemical combination—illustrated by (1) candle burning in air, (2) magnesium ribbon burning in air, and (3) sulphur burning in air.

(b) Chemical decomposition—illustrated by (1) action of sodium on water, (2) heating mercuric oxide, and (3) heating potassium chlorate.

3. Air, its composition; preparation of oxygen and nitrogen, and study of their properties.

4. (1) Water, its composition; (2) Preparation and properties of Hydrogen; (3) Hard and soft water.

5. (1) Phenomena of burning and rusting; (2) Conservation of mass.

6. Study of (1) three forms of carbon, (2) oxides of carbon, (3) coal, (4) sulphur and its oxides.

7. Atoms and molecules.

8. Definition of acids, bases and salts.

9. Study of the following metals:—Iron, Magnesium, Mercury, Zinc; their properties and uses.

*N.B.*—The course should be treated in an elementary manner and should be fully illustrated by suitable experiments. Records of demonstration shall be kept by pupils for inspection.

The Examination shall consist of one paper of two halves, one in Physics and one in Chemistry. The marks shall be distributed as follows:—

Physics	... 50
Chemistry	... 50

## IX

### MENSURATION AND SURVEYING

The course in Mensuration and Surveying shall include:—

(a) *Geometry*: Practical—As under Mathematics (Compulsory).

The candidate is required to learn the use of Dividers, Compasses, Straight-ruler and Protractor.

(b) *Construction of Scales*—

(i) Construction of a scale of equal parts.

(ii) Construction of a decimal diagonal scale.

(c) *Mensuration of Lines*—

Tables of Lineal Measure—Right-angled triangle—Altitude of a triangle—Similar triangles—Chords of a circle—Circumference of a circle—Regular figures.

*(d) Mensuration of Surfaces—*

Tables of Square Measure—Rectangle. Parallelogram.  
Triangle. Quadrilateral. Irregular Rectilineal figures  
—Circle, Cone, Sphere.

*(e) Mensuration of Volumes—*

Parallelepiped, Prism, Cylinder, Pyramid, Cone, Sphere,

*(f) Land Surveying—*

Use of the Chain—of the Offsets—of the Cross-staff—of  
the Field-Book. Simpson's Rule.

## X

## ELEMENTARY MECHANICS

The course in Elementary Mechanics shall include:—

## I. Motion—

Varieties of motion.

Elementary notions of speed, velocity and acceleration.

Motion of a body with constant acceleration.

Composition and resolution of motions.

Bodies falling freely under gravity.

Special cases of bodies falling under gravity (inclined  
plane, projection in any direction, etc.)

General idea of work and energy; Kinetic Energy and  
Potential Energy.

## II. Force—

Elementary notions of mass, inertia and momentum.

Newton's Laws of Motion.

Units of Force: poundal, dyne.

Relation between mass and weight.

Moments.

Impulsive forces—impulse.

Balancing of forces.

Conditions for the equilibrium of three forces not  
parallel.

Triangle and parallelogram of forces.

Conditions for the equilibrium of three parallel forces.

Centre of parallel forces.

Centre of gravity. Mass-centre. Position of centre  
of gravity in stable and unstable equilibrium.

Methods of finding the centre of gravity of systems of particles in elementary cases.

Mass-centre of a triangle—of the perimeter of a triangle—of two bodies whose individual mass centres are given.

Illustrations of conditions of equilibrium in simple machines; levers; balance; pulleys; inclined plane.

The subject is to be treated mainly experimentally. No knowledge of Mathematics except such as may be necessary for elucidating experiments and as may fall within the limits of the Matriculation Mathematics (Compulsory) shall be required.

## XI

### ELEMENTARY HYGIENE

The course in Hygiene shall include—

1. Introduction—Definition of Hygiene—Personal and public—a short history of the development of modern public health work—Public health a summation of personal health.
2. General structure and functions of the human body—
  - (a) The cell—different kinds of tissues—bone—muscle—nerve. The central nervous system and special senses.
  - (b) Digestion—functions of mouth, stomach, intestine, liver, pancreas.
  - (c) Blood and its circulation—Heart and blood vessels.
  - (d) Respiration—air passages—lungs.
  - (e) Excretion—kidneys—bladder.
  - (f) Skin.
  - (g) Body temperature—the production and loss of heat—Heat control in cold and warm weather—clothing—bathing.
3. Health—what is health—value of health.
4. Exercise—the importance of exercise—effects of exercise on circulation, respiration, muscles, skin and nutrition—forms of exercise—good and bad posture—evil effects of bad posture.
5. Environment—
  - (a) What is meant by environment.
  - (b) Essential features of good environment.
    - (i) Sunlight—health values of sunlight.
    - (ii) Air—the relation of weather and outdoor air to health—indoor air and health—harmful constituents of outdoor and

indoor air—ventilation—natural ventilation—window ventilation—mechanical ventilation—bad effects of overcrowding—common air-borne diseases—purification of air, natural and artificial.

(iii) Soil—Sanitary significance of soil—pollution of soil and bacterial diseases, *e.g.*, Tetanus, Typhoid, Cholera, Dysentery—soil and its connection to hook-worm infection.

(iv) (a) Water—hard and soft water—importance of water in relation to health—sources of water—water cycle—rain water—surface water—ground water—spring water—pollution of water—natural purification.

(b) Water supply in Bengal—tanks, wells, tube-wells, streams—how to avoid pollution—reserved tanks.

(c) Common methods of purification of water—filtration—filter beds—mechanical filter; evils of improper domestic (*ghara*) filters; purification by the use of chemicals—use of permanganate and chlorine—boiling—distillation.

(d) Storage and distribution of water in houses and institutions and in villages and towns; water-borne diseases; evil effects of impure water and dangers of scarcity of water.

(v) (a) Dwelling Houses—selection of site; houses to be constructed on well-thought-out plans; plenty of light and air; protection against damp; good drainage; privies, cowsheds and stables at some distance from the main building; sufficient open space between contiguous houses; adequate arrangements for disposal of refuse and filth.

(b) Huts in villages; low lands to be avoided; plinth well-raised; sufficient number of openings for light and air in each room; situation of latrines and cowsheds; arrangements for drainage and disposal of sewage.

(vi) Food—its principles and their respective functions and the importance of each in relation to growth and maintenance of health. The value of milk and milk products—General composition of common food-stuffs—importance of varied diets and avoidance of monotony—cooking—food adulteration—food in relation to disease (food poisoning).

## 6. Sources and modes of spread of diseases—

(i) *Man*—‘ Droplet infections ’ carried from one person to another by coughing, sneezing, etc.; common colds, influenza, pneumonia, diphtheria, tonsillitis, tuberculosis and small-pox carried in this way—carriers.

Remedies—Avoid overcrowding in home, sleeping rooms, schools and elsewhere.

(ii) *Water and food*—In relation to Cholera, Typhoid, Dysentery, etc.

(iii) *Insects*—Mosquitoes, flies, fleas, lice, etc., in relation to malaria, dengue fever, plague, relapsing fever, etc.

Remedies—prevention of breeding and control of mosquitoes and flies.

(iv) *Animals as sources of infection*—Tuberculosis in cattle and hogs—Tetanus—Enteritis—Plague—Rabies.

7. Prevention of disease—Methods for control of communicable disease—

(i) Immunization (Cholera, Typhoid, Diphtheria and Small-pox, as examples).

(ii) Quarantine and isolation (chicken-pox, measles, whooping cough and plague, as examples).

(iii) Sanitation—

(a) A good system of filth-removal and waste disposal, water conservancy, direct disposal of sewage; balanced filter, trenching, septic tank, incineration.

(b) Avoidance of pollution of soil, water, food and air.

(c) Common methods of disinfection of rooms, beddings, clothes, excreta, and other infected materials.

(iv) Health Education.

8. Community Health problem—

(a) Tuberculosis as a community health problem—community health and tuberculosis demonstrations—tuberculosis in Bengal—developing an organised attack against tuberculosis, sanatoria, etc.

(b) Malaria as a community health problem—village sanitation—restoration of natural drainage—preventive measures—anti-malarial societies—necessity of co-operation.

9. Health of the school child—health education—health inspection—medical examination—health promotion—sanitation of buildings and grounds—physical training—hygiene teaching.

10. Personal Hygiene—An application in one's daily life of the principles and knowledge acquired above. Care of teeth, hair and skin. Eye-sight and its preservation. Clothing according to climate and occupation.

*Note.*—It is not intended that candidates should be examined in Chemistry, Anatomy, Physiology or like contributory subjects, but the students should be taught with the aid of experiments such simple facts in these contributory subjects as may be essential for an elementary scientific knowledge of Hygiene.

11. Mental Hygiene—close relation between body and mind—the three main instincts, ego, sex and social—choice of occupation and mental hygiene—personality culture including education in feelings like fear, anger, etc., and education in ideas like perception, memory, imagination and thought—mental hygiene of the pre-school and school child.



N.B.—A. The following experiments should be shown to the students in the class or in the laboratory:—

- (1) Products of oxidation.
- (2) Products of respiration.
- (3) Action of saliva on starch.
- (4) Action of pepsin and hydrochloric acid on boiled meat or gelatine.
- (5) Action of Benedict's or Fehling's Solution on sugar solution on boiling.
- (6) Effect of evaporation on wet-bulb thermometer.
- (7) Use of filter-paper.
- (8) Distillation.
- (9) Action of a weak acid solution and a weak alkaline solution and milk on litmus papers.
- (10) Specific gravity of milk and water.
- (11) Action of alum on muddy water.

B. The following microscopic slides should be shown to the students:—

- (1) A living cell, *e.g.*, yeast or any unicellular organism.
- (2) Blood-cells.
- (3) Cells composing different tissues, *e.g.*, muscle cells, nerve cells, epithelium cells, etc.

C. The following activities should be encouraged:—

- (1) Measuring height and weight every month or quarterly.
- (2) Recording of dry-bulb, wet-bulb and barometric readings of the class room every day.
- (3) To submit report on the sanitation of classes, school building and school playgrounds.
- (4) To keep a record of health habits of the students of the class.

The above list is not exhaustive.

## XII

### ELEMENTS OF BIOLOGY

Types of life; plants and animals; their distinction. Classification into main groups and the necessity for such a scheme. Homology and analogy. Man's relationship to the rest of the animal kingdom. Protoplasm and its functions. The cell and its structure. Unicellular and multicellular organisms. Outlines of evolution and heredity. Bilateral and radial symmetry. Metamorphosis of animals. Social habits of wasps, bees and termites. Animal and plant colouration. Mimicry. Elementary knowledge of the essential functions of a living organism; nutrition and growth, source of food of plants and animals, photo-synthesis; circulation of the nutritive materials; excretion; reproduction and germination; sensation and movement in plants and animals.

Floral parts, simple and compound leaves. Pollination of plants by animals. Dispersal of seeds by animals or other agencies. Elementary knowledge of the structure of the following types:—

- (1) Animal—Earthworm, Apple snail (*Pila*), Palaeman, Cockroach and Toad.
- (2) Plant—A Fern (*Aspidium* or *Pteris*), flowering plants (gram or pea plant and onion plant).

### PRACTICAL

(1) Candidates shall dissect and draw the coarse anatomy of the above types, including the circulatory, alimentary, excretory, nervous, reproductive and skeletal systems of the animals, and the external and internal morphology of the plants.

(2) Microscopic demonstrations of *Amœba*, *Paramœcium*, *Hydra* and the elementary tissues of the Toad; a fungus (*Mucor* or *Yeast*), *spirogyra*, moss.

Apparatus required for a class of twenty pupils:—

One Microscope (student's type) for demonstration purpose.  
Two dissecting lenses on stands.  
Twenty dissecting dishes.

Pupils must provide themselves with their own dissecting cases, containing scissors, scalpels, mounted needles and forceps; also glass slides and cover slips.

*N.B.*—There shall be no practical examination held by the University but every candidate who desires to be examined in this subject must produce (a) a certificate from the Head Master of the school from which he appears to the effect that he has completed the practical course prescribed by the Regulations, and (b) a record of the practical work done by him.

## XIII

### ADDITIONAL MATHEMATICS

The course in Additional Mathematics shall include, in addition to the syllabus for the Compulsory Mathematics, the following:—

(A) Arithmetic—Compound Interest; Exercises in the Metric System; Approximation to a specified degree of accuracy including contracted processes.

(B) Algebra—Quadratic Equations with one unknown quantity; Extraction of Square Root; Graphs of Pure Quadratic Equations (excluding constructions with different scales along two axes); Arithmetical and Geometrical Progressions; the Elementary Laws of Indices.

## (C) Geometry—

## PRACTICAL

Simple cases of the construction of circles satisfying given conditions.

Construction of regular figures of 3, 4, 5 or 6 sides in or about a given circle.

Construction of a square equal in area to a given rectangle.

## THEORETICAL

*Proportion: Similar Triangles*

If a straight line is drawn parallel to one side of a triangle, the other two sides are divided proportionally; and the converse.

If two triangles are equiangular, their corresponding sides are proportional; and the converse.

If two triangles have one angle of the one equal to one angle of the other, and the sides about these equal angles proportional, the triangles are similar.

If a polygon is divided into triangles by a line joining a given point to its vertices, any similar polygon can be divided into corresponding similar triangles.

The ratio of the areas of two similar triangles, or of two similar polygons, is equal to the ratio of the squares on the corresponding sides.

The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle; and likewise the external bisector externally.

## (D) Trigonometry—

Measurement of angles; Sexagesimal and Centesimal Measure; Circular or Radian Measure.

Trigonometrical ratios for angles less than a right angle—  
Trigonometrical Ratios for  $0^\circ$ ,  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ .

Simple Problems in Heights and Distances.

The distribution of marks shall be as follows:—

(A) Arithmetic	...	...	30 marks.
(B) Algebra	...	...	25 „
(C) Geometry	...	...	30 „
(D) Trigonometry	...	...	15 „

## XIV

## BUSINESS METHOD AND CORRESPONDENCE

The course in Business Method and Correspondence shall include—

1. Writing of business letters and announcements;
2. Characteristics and parts of a business letter;

3. The treatment of outgoing correspondence, preserving copies, indexing, précis writing, filing inward correspondence, docketing, addressing envelopes, etc.;

4. Drafting of advertisements;

5. Various modern office appliances;

6. Telegram (including codes);

7. Business Forms such as Invoices, Statements, Receipts, Cheques, Paying-in slips, Debit and Credit Notes, Bills of Exchange, etc.;

8. Preparation of the above Commercial forms from particulars given; Different kinds of books kept in an office—their nature and contents;

9. Methods adopted in Export and Import Trade;

10. Banks and their services;

11. Coins and weights and measures of principal countries;

12. Sale of goods;

13. A general knowledge of business undertakings—Partnership: Private and Limited;

14. An elementary knowledge of Joint Stock Companies' procedure;

15. Necessary Books, Forms, Returns, etc.;

16. Business terms and abbreviations;

17. Insurance and its importance.

## XV

### COMMERCIAL GEOGRAPHY

The course in Commercial Geography shall include the following:—

1. Early Trade and Traders; Great Discoveries; Trade and Traders of to-day; Importance of Commercial Geography; Influence of Physical features and climate on Commerce; Climatic belts; Vegetation regions.

2. Configuration and position—Mountains—Rivers—Nature of coasts—a general idea of their influence upon distribution of population, occupations, industries and transport of a country.

3. Principal products of the World:—Agricultural—Pastoral—Mineral—Manufacturing; their chief places of origin and important markets.

4. An elementary knowledge of the causes of the rise and growth of Towns, Ports and Markets.

5. Modes of Transport; Railways and Commerce; Ocean Highway—Ports, Atlantic Highway, Pacific Highway and Indian Highway.

6. Economic Geography of India with special reference to (a) Soils. (b) Climate, (c) Principal Agricultural, Pastoral and

Mineral products, (d) Principal Industries, (e) Cities and Ports, (f) Nature and direction of foreign trade, (g) Internal trade, (h) Communication, (i) Irrigation, and (j) Source of Power.

## XVI

### ELEMENTS OF PUBLIC ADMINISTRATION IN INDIA

Historical Survey—The East India Company as a Trading Corporation—the territorial possessions of the East India Company—the grant of Dewani—the Regulating Act of 1773—Pitt's India Act of 1784—Renewals of the Company's Charter—The Charter Act of 1833—The Sepoy Mutiny and the transfer of the administration of India to the Crown. The India Councils Act of 1861—The Act of 1892—The Morley-Minto Reforms of 1909—the announcement of August, 1917—The Montagu-Chelmsford Report—The Government of India Act of 1919—The Government of India Act, 1935.

The Secretary of State for India and his Advisers—The Government of India—The Governor-General and His Majesty's Representative—The Federation of India—The Federal Executive—Council of Ministers—Provisions as to defence, ecclesiastical affairs, external affairs, and the tribal areas—special responsibilities of Governor-General—Executive Departments—The Army—The Secretariat.

The Federal Legislature—Its composition and functions—Relation between the two Houses.

The Provincial Governments—The Governor—Council of Ministers—The Provincial Secretariat—The Departments of Administration—The Provincial Legislature.

The control exercised by the Governor-General over the Provincial Governments.

The District Administration—Sub-districts.

The Judiciary—The Judicial Committee of the Privy Council—The Federal Court—The High Courts—The Subordinate Judiciary.

The Public Service.

Finance—The Principal sources of revenue and the main heads of expenditure of the Federal and the Provincial Governments—the Public Debt of India.

The Indian States.

Local Self-Government—The beginnings of Municipal administration—Lord Mayo's Resolution—Lord Ripon's Reso-

lution—Municipalities, Improvement Trusts, District Boards and other Rural Boards—Local Finance—Chief sources of income of local bodies—Main heads of expenditure.

## XVII

## ADDITIONAL ENGLISH

The course in Additional English shall include selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The marks in the paper shall be distributed as follows:—

- |   |     |           |
|---|-----|-----------|
| (i) Questions on the subject-matter and language of the prescribed text | ... | 50 marks. |
| (ii) Questions on Grammar and Composition                               |     | 20 marks. |
| (iii) Essay   | ... | 30 marks. |

The Essay will be set from books of general interest prescribed for rapid reading.

No detailed knowledge of the contents of the books will be required.

## XVIII

## ARITHMETIC AND DOMESTIC SCIENCE INCLUDING DOMESTIC HYGIENE

*(For Girls only)*

Arithmetic	...	35 marks.
Domestic Science including Domestic Hygiene		65 marks.

## Arithmetic

The four Simple Rules, Vulgar and Decimal Fractions, Reductions, Extraction of Square Root, Practice, Proportion, Simple Interest, Present Worth, Discount, Stocks and Shares. Problems more easily solvable by Algebra should not be required to be solved arithmetically.

Domestic Science including Domestic Hygiene.

1. The House—(a) Location—site and accommodation. Plenty of air and sunlight. The importance of sunlight to health.

(b) Air and Ventilation—The composition of air; simple methods of detecting oxygen and carbon dioxide in the air; quantity of fresh air required for each individual; changes in air due to human habitation; impurities in air; effect of occupants on air of rooms; the importance of fresh air specially in connection with common air-borne diseases, *e.g.*, Tuberculosis, etc. The main principles involved in ventilation. Simple methods of purification of air.

(c) Water—Quantity of water required for each person; sources of water-supply; sources of impurities; hard and soft water; method of softening hard water and its reaction to soap; reservation and storage of water; water as carrier of disease; filtering, boiling and other simple household methods of purification.

(d) Decoration, etc.—Furniture and equipment; cleanliness and repairs; avoidance of germs, insects and pests in the house.

(e) Drainage, etc.—Removal of dry refuse; flush systems; importance of some form of village latrines; influence on health of defective and dirty drains; the compound.

II. Laundry work—(a) Choice and care of laundry utensils; simple experimental work to illustrate the removal of dirt and stains.

(b) The composition and effect of soda, starch, blue, etc., as used in laundry work.

(c) Methods of washing and finishing household linen; white and coloured cotton materials, silk and woollen garments.

III. Cookery—(a) Food—its principles (protein, fat, carbohydrates, salts, vitamin and water); their functions; the importance of proteids and vitamins to the young child and youth; the great value of milk and milk-products in childhood and youth; the general composition of the common food-stuffs; importance of varied diet and avoidance of monotony; common adulteration of food; food in relation to disease.

(b) Choice of food and their cost.

(c) Management of store rooms; planning menus for the home.

(d) Methods of cooking—economy of fire in the kitchen.

IV. Domestic Economy—(a) Petty cash book and its maintenance; cheques; Paying book and Pass book.

(b) Income and expenditure—Domestic Budget, unforeseen items; necessity of saving.

(c) Life Insurance—Different types of policies and payment of premiums.

(d) Possibilities of supplementing family income—Home industries.

V. Personal Hygiene. (A general knowledge of the elementary structure and functions of the human body is taken for granted.)

Breathing; rest and exercise; bathing with care of teeth, hair and skin; use and action of soap; cleanliness of person; relative hygienic values of cotton, linen, wood, silk; clothing, bedding.

VI. Infection and disinfection—Simple fact concerning common infectious diseases; insects as carriers of disease; common methods of disinfection.

VII. Simple home nursing—Care of sick room; care of patient; invalid cookery and administration of medicine; keeping of records for doctor's use.

*Note.*—The pupil should be taught with the aid of experiments such simple facts as may be essential for an elementary scientific knowledge of "Domestic Science and Domestic Hygiene."

## XIX

### SEWING AND NEEDLEWORK

*(For Girls only)*

The Examination will be practical and written, and will be so arranged as to test the candidate's skill in the cutting out and making of the garments mentioned in the list for children and adults, as well as her knowledge of the nature of materials commonly used for these garments.

Group A

... 40 marks.

*Theoretical* (1 hour)—

Questions will be set on the following subjects:—

1. The most suitable materials to be used for garments, their source, hygienic qualities, uses and cost.
2. Simple methods of pattern-making.
3. Drawing a diagram of any simple garment.
4. The cutting out of garments and their construction.
5. The various stitches and processes used in plain and decorative needlework.
6. Methods of patching and darning and general repairs.



7. Machining, management and care of the Sewing Machine.

Group B ... 30 marks.

*Practical (2 hours)—*

Each candidate may be required to cut out, from given measurements, any garment or the section of a garment specified in the given list, and to tack together or make such portions as may be indicated at the time of the examination.

*N.B.*—Candidates must bring with them to the practical examination a ruler, a red and blue pencil, cotton, needles, pins, a thimble, scissors and a tape measure, and to the theoretical examination a ruler and a pencil.

The necessary materials will be provided by the University.

*Prepared works* ... 30 marks.

Each candidate will be required during the preceding two or three years to the year of examination, to execute the examples stated in (a) and (b):—

(a) (1) A child's frock (6 to 10 years), a petticoat (bodice and princess style) to be cut out and made entirely by hand.

(2) A child's overall, cut and embroidered.

(3) A Magyar bodice, a blouse and a petticoat.

(4) A shirt.

(5) A knitted suit for a child (including cap).

(6) A pair of knitted socks on four needles.

(7) A patch in a garment made of cotton, silk and flannel.

(8) Darning, repairing a hole.

(b) A knowledge of the following stitches in embroidery either on samples or on garments, is expected of the candidates:

Kontha, chain, stem, satin, kashmere, fishbone, feather and canvas stitches, French knots, punctured work. Fancy work on net and in *jori*.

A corner suitable for a pillow case; drawn thread and crotchet; Richelieu or Applique.

*N.B.*—The candidate who has executed her examples under the supervision of the teacher must produce a certificate by the teacher to the effect that it has been executed solely and entirely by the pupil herself.

## XX

## (A) MUSIC

*(For Girls only)*

Voice and Ear Training—Simple ear-tests, such as being able to recognise any note of the scale, the key-note being given.

Swara Exercises—Ash and Gamak Sadhan.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Alaiya, Bibhas, Khambaj and Jhinjit.

Time: Tal—Correct beating of the hands.

The singing of the above Raginis in Tetala, Thungri, Ektala and Dadra.

Dandamatric and Akaramatric notation.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Iman Kalyan, Kaphi, Behag and Desh.

Tals :—Jhamptal and Teora.

Elementary theory of Swaras and Raginis learnt.

Simple Tans.

Four Bengali or Hindusthani songs in each of the following Raginis :—

Bhairabi, Chhayana, Pilu and Bagesri.

Tals :—Chautal and Surphanktal.

Singing at sight simple songs in the Raginis taught in either notation.

Four Bengali or Hindusthani songs in each of the following Ragas and Raginis :—

Bhairab, Purabi, Mallar and Asavari.

Three Kirtans in Jhamptal, Lophā, Teot.

Three Baul songs.

Some lessons in Instrumental Music, *e.g.*, Sitar, Esraj, Violin or Veena, Raginis being the same as in the case of vocal music.

Suitable books on the subject will, from time to time, be recommended by the Syndicate and directions given for the holding of the examination.

(B) ALTERNATIVE SYLLABUS IN  
WESTERN MUSIC

*(For Girls only)*

- A. Questions will be asked on Notations, Scales, Clef, Keys, Intervals, Time, and generally the marks and terms used in Music.
- B. Aural Tests. Candidates will be asked to reproduce, in one pitch, examples of musical rhythms played on the piano; to write a short phrase from dictations, and to divide it into bars, key and keynote being given; to recognise diatonic intervals formed by any two notes of the scale, the keynote being sounded; to recognise common chords and their inversions.
- C. Writing from memory, in any key specified by the Examiner, the melody of one or more of a number of Folk Songs prescribed in advance for study. Other questions may be set on these songs.
- D. (i) To write a melody the rhythm of which will be specified.  
(ii) To add a voice part to a given one.
- E. Instrumental Music (Piano or approved Stringed Instrument) and singing.
  - (i) Studies to be prescribed from time to time.
  - (ii) Reading at sight of simple exercises.

XXI .

DRAWING AND PAINTING INCLUDING AN  
APPRECIATION OF FINE ARTS

The course shall consist of a Practical part and a Theoretical one, carrying respectively 40 and 60 marks. Questions on the practical part will include (a) reproduction to a scale of an outline drawing, (b) memory drawing of one of a number of familiar subjects.

The syllabus for the practical part shall consist of Black-board Drawing, Free-hand Drawing and Memory Drawing.

The Examination on the theoretical part shall include simple questions on the appreciation of Painting, Sculpture and Architecture on the lines of the following syllabus:—

**Architecture:** Elements of Architectural Forms. Ground Plan, Elevation, General Principles. Ornamentation; Architectural Sculpture. Analysis of Typical Examples of Asiatic and European Architecture based on the study of a limited number of standard works of Architectural Art, with special emphasis on Indian Architecture.

**Painting:** Elements of Pictorial Forms. Principles of Composition and Design. General Principles of Colour. Elements of Calligraphy. Analysis of Typical examples of Asiatic and European Painting based on the study of a limited number of standard works of Pictorial Art, with special emphasis on Indian Painting.

**Sculpture:** Elements of Sculptural Forms. Figures in the Round. Figures in Relief. Imitation of Natural Forms. Decorative Sculpture. Analysis of Typical examples of Asiatic and European Sculpture based on the study of a limited number of standard works of Sculptural Art with special emphasis on Asiatic Sculpture.

The University will prepare and publish text-books including reproductions of selected master-pieces of Art recommended for study.

For the Practical course the Syndicate shall recommend, from time to time, standard Drawing Books.

### GENERAL

13. In order to pass the Matriculation Examination a candidate must obtain—

- (i) 36 per cent. of the total marks in Vernacular and in English;
- (ii) 30 per cent. of the total marks in each of the other subjects;
- (iii) 36 per cent. of the total marks in the aggregate of all the compulsory papers.

14. Candidates who obtain 60 per cent. of the marks in the aggregate shall be placed in the First Division, and those who obtain 50 per cent., in the Second Division. Other successful candidates shall be placed in the Third Division. If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 30 obtained by him in any additional subject shall be added to his aggregate, and the aggregate so obtained shall determine his division and his place in the list.

15. Any candidate who has failed in one subject only and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining First Division marks in the aggregate shall be allowed to pass. In order to determine the division in which such a candidate will be placed and his place in the division, the number of marks by which he has failed in one subject shall be deducted from his aggregate.

16. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate or for any other reason, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXI

### INTERMEDIATE EXAMINATION IN ARTS

1. The Intermediate Examination in Arts shall be held annually in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in one or more Colleges affiliated for this purpose, for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Intermediate Examination in Science may take up the course for the Intermediate Examination in Arts at the second year's stage, and, after one year's regular course of study in one or more Colleges affiliated for the purpose, appear at the examination. He will be excused attendance and examination in the subject or subjects in which he has already passed at the Intermediate Examination in Science.

3. Every candidate sent up for the Intermediate Examination in Arts by an affiliated College shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests, and (d) of probability of passing the examination. Every candidate for admission shall send in his application with a certificate in the form prescribed by the Syndicate either to the Registrar or to a local officer recognised by the Syndicate. Every such application must reach the office of the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of thirty rupees shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent Intermediate Examinations in Arts on payment of a like fee of thirty rupees on each occasion, subject to the provisions of sections 4B and 4C.

Provided that if a candidate who has passed the Intermediate Examination in Arts or Science and is prosecuting his studies for a higher examination in a College affiliated to this University, is required by the University to appear in a special subject at the Intermediate Examination in Arts, he shall pay a reduced fee of fifteen rupees only.

4A. If a student, after completion of a regular course of study for the examination does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other affiliated College or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students

appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or, with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the test examination held by such a college immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a member of the Senate testifying to his good character during the intervening period. Provided further that in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College or from some other authority approved by the Syndicate to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 15, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last studied or from a member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.



If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of section 4B above.

5. The Intermediate Examination in Arts shall be conducted by means of printed papers, the same paper being used at every place at which the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions, the first in order of merit and the second and third in alphabetical order. Names of candidates who pass the examination under section 4C above shall be published separately, arranged in alphabetical order, without any division or distinction. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A.

7. The subjects for the Intermediate Examination in Arts shall be—

(1) English ... .. *Three papers.*

(2) One of the following vernacular languages:—Bengali, Hindi, Uriya, Assamese, Urdu, Burmese, Modern Armenian, Khasi, Nepali, Maithili, Modern Tibetan, Marathi, Gujarathi, Telugu, Tamil, Kanarese, Malayalam, Sinhalese, Portuguese, Manipuri, Sindhi, Panjabi (Gurumukhi), Persian, provided that a candidate may take up the last subject if it is not taken up as a Classical language. *One paper.*

The Syndicate shall have power to add to this list.

If the vernacular of a candidate is a language not included in the above list, he shall have an alternative paper of a somewhat advanced character in English.

(3), (4) and (5) Three of the following subjects, of which two at least must be from Group A:—

#### GROUP A

(i) One of the following languages:—

Sanskrit, Pali, Arabic, Persian, Hebrew, Classical Armenian, Greek, Latin, French, German, Italian, Syriac.

Or

One of the following languages:—

Bengali, Hindi, Assamese, Urdu.

Provided that a student will not be allowed to take up any of these four languages for the Intermediate Examination in

Arts unless he has passed the Matriculation Examination in a Classical Language; such a student shall be examined in a Special Paper in the Classical Language in which he passed the Matriculation Examination in lieu of the paper in Vernacular; the proviso, however, will not apply in the case of a candidate who takes up a language which is not his own Vernacular. Such a candidate shall appear in his own Vernacular paper at the Intermediate Examination.

- (ii) History.
- (iii) Logic.
- (iv) Mathematics.
- (v) Elements of Civics and Economics.
- (vi) Commercial Geography.
- (vii) Commercial Arithmetic and Elements of Book-keeping.

#### GROUP B

- (i) Physics.
- (ii) Chemistry.
- (iii) Geography.
- (iv) Physiology.
- (v) Botany.
- (vi) Zoology.
- (vii) Geology.
- (viii) Anthropology.
- (ix) Biology.
- (x) Psychology.

There shall be *two papers* in each of the subjects enumerated under Group A. In each of the subjects under Group B there shall be *two theoretical papers* and *one practical paper*.

8. Every paper in every subject shall be of three hours, and shall carry 100 marks, excepting that in any subject under Group B each theoretical paper shall carry 75 marks and the practical paper 50 marks, and of these 50 marks 10 marks shall be set apart for laboratory note-books.

8A. Candidates may also be examined, if they so desire, in an additional subject included under Group A, provided they have not already taken the subject. In this optional subject there shall be *two papers* of three hours each.

9. The Syllabus in Mathematics and in all the subjects in Group B shall be the same as that prescribed for the Intermediate Examination in Science.

10. There shall be a practical examination in each Science subject, and candidates shall be required to pass in the practical portion of the subject as well as in the theoretical portion

defined in the Syllabus. Every student who desires to be examined in any such subject must produce a certificate from the Principal of his College to the effect that he has completed in an affiliated College the corresponding practical course prescribed by the Regulations.

11. The following are definitions of the limits of the above subjects:—

### ENGLISH

*Paper I.*—Poetry texts.

*Paper II.*—Prose texts.

*Paper III.*—(a) Essay, (b) Prosody and Rhetoric, (c) Questions on unseen passages from books of the same standard of difficulty as those recommended for the Matriculation Examination—

(a)	shall carry	40	marks.
(b)	„ „	20	„
(c)	„ „	40	„

### VERNACULARS

1. The course in Vernacular shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which students will be expected to have read.

2. The examination shall include:—

- (a) Questions on the subject-matter and on the language of the prescribed texts ... 40 marks.
- (b) An unseen passage to be summarised or amplified in the Vernacular ... 15 marks.
- (c) Translation from English into Vernacular ... 15 marks.
- (d) Questions on Composition ... 10 marks.
- (e) An Essay in Vernacular—headings being given ... 20 marks.

3. (a) The unseen passage shall not exceed in difficulty the Vernacular texts prescribed for the examination.

(b) Questions shall not be set on the history of language or literature of the Vernacular.

4. The Alternative Paper in English (for candidates whose Vernacular is a language not included in the prescribed list) shall include:

(a) Questions on selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English, and

(b) Questions on composition, including Rhetoric and Prosody.

*Special Paper in Classical Language in lieu of  
the Paper in Vernacular*

The marks in the Special Paper in Classical Language shall be distributed as follows:—

- (i) Questions on the Prose and Poetry Texts.  
Not more than 20 marks shall be assigned  
to mere translation from the set texts ... 60 marks.  
The questions on the texts shall comprise—
  - (a) Passages from the texts for translation into English.
  - (b) Questions on the subject-matter of the text.
  - (c) Questions on the language of the texts and grammatical questions relating thereto.
- (ii) Questions on Grammar including passages  
for correction ... 20 marks.
- (iii) Passages for translation from English into  
the Classical Language taken ... 20 marks.

### SANSKRIT

1. The course in Sanskrit shall consist of selected passages in prose and verse. The texts in poetry shall include a portion of the Bhattikavya, and a portion either of the Raghu-  
vansa or of the Kumar-Sambhava. The text in prose shall be taken from the Dasakumaracharita and the Mahabharata.

To the above list, other works \* may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Sanskrit.

2. The course shall also include the elements of Sanskrit Grammar, of which a fuller knowledge shall be required than at the Matriculation Examination. A text-book in Grammar shall be prepared and prescribed by the University and be its property.

3. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the Poetry texts. Not more  
than 25 marks shall be assigned to  
mere translation from the set texts ... 50 marks.

\* The following works have been added by the Syndicate on the recommendation of the Board of Studies in Sanskrit:—

Vasavadatta, Kadamvari, Harshacharita, Kathasaritsagara, Balacharita and Bhagavadgita.

- (b) Questions on Grammar, including passages for correction ... 25 marks.  
 (c) Passages for translation from English into Sanskrit ... 25 marks.

*Paper II.*

- (a) Questions on the Prose texts. Not more than 15 marks shall be assigned to mere translation from the set texts ... 30 marks.  
 (b) Unseen Sanskrit passages for translation into English ... 30 marks.  
 (c) Questions on Grammar ... 15 marks.  
 (d) Passages for translation from English into Sanskrit ... 25 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,  
 (b) Questions on the subject-matter of the text,  
 (c) Questions on the language of the text and grammatical questions relating thereto, and  
 (d) Passages for translation into English from such standard Sanskrit commentaries on the set texts as may be prescribed from time to time.

4. Unseen passages shall consist of simple prose not exceeding in difficulty the prose texts set for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## PALI

1. The course in Pali shall consist of such pieces in Prose and Poetry as may be prescribed by the Syndicate, on the recommendation of the Board of Studies concerned, from the following works:—

- (a) Digha Nikaya.  
 (b) Khuddaka Nikaya.  
 (c) Milindapanha.  
 (d) Mahavansa.

The Selections should be such as to afford an elementary knowledge of the Doctrines and History of Buddhism.

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

2. The course shall also include a knowledge of Pali Grammar of a higher standard than that required at the Matriculation Examination.

Grammars shall be recommended from time to time by the Board of Studies concerned.

3. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the Poetry texts. Not more than 25 marks shall be assigned to mere translation from the set texts ... 50 marks.
- (b) Grammatical questions ... 25 marks.
- (c) Passages for translation from English into Pali ... 25 marks.

*Paper II.*

- (a) Questions on the Prose texts. Not more than 25 marks shall be assigned to mere translation from the set texts 50 marks.
- (b) Unseen Pali passages for translation into English ... 30 marks.
- (c) Grammatical questions ... 20 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

Unseen passages shall consist of simple prose not exceeding in difficulty the texts set for the Matriculation Examination.

### ARABIC

1. The course in Arabic shall consist of such portions as may be prescribed by the Syndicate, on the recommendation of the Board of Studies concerned, of the following works:—

- (1) *Athbaq-al Dhahab* by Abdul Mu'min al Isfahani.
- (2) *Ikhwanu'l-Safa*.
- (3) *Al Fakhri* by Ibn-i Tiqtaqi.
- (4) *Muruju'l-Dhahab* by Mas-'udi.
- (5) *Adabud Dunya wad Din* by Mawardi
- (6) *Diwan* by Hassan Ibn Thabit.
- (7) *Majani-ul Adab*, Parts III and IV.
- (8) *Nukhabul Mulah*, Parts II and III.
- (9) *Maqalat-i Ali*.
- (10) *Manjamut Tibr*.
- (11) *Qur'an*.
- (12) *Qalyubi*.
- (13) *Kalila wa Dimna*.
- (14) *Tarikh-al Kamil* by Ibn Athir.

To the above list other works \* may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu.

\* For subsequent modifications in the list made by the Syndicate on the recommendation by the Board of Studies in Arabic, Persian and Urdu *vide* Appendix D.

The selections shall be prepared by and be the property of the University.

2. The course shall also include Arabic Grammar, of which a fuller knowledge shall be required than at the Matriculation Examination.

A text-book in Grammar shall be prepared and prescribed by the University and be its property.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the texts ... 50 marks.  
Not more than 25 marks shall be assigned to mere translation.
- (b) Grammar, including passages for correction and unvocalised passages for vocalisation ... 30 marks.
- (c) Simple English passages for translation into Arabic ... 20 marks.

*Paper II.*

- (a) Questions on the texts ... 30 marks.  
Not more than 15 marks shall be assigned to mere translation.
- (b) Unseen passages of Arabic for translation into English ... 30 marks.
- (c) Questions on Grammar ... 15 marks.
- (d) Simple English passages for translation into Arabic ... 25 marks.

The passages for translation from English into Arabic shall in no case be translated portions of the prescribed texts.

Questions on the texts shall comprise—

- (a) Passages from the set texts into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall consist of simple prose not exceeding in difficulty the text set for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## PERSIAN

1. The Persian Course shall consist of select passages in Prose and Verse from any or all of the following works.

*Prose*

- (1) Anwar-i-Suhaili.
- (2) Akhlaq-i Muhsini.
- (3) Tarikh-i Iran by Mirza Hairat.
- (4) Tarikh-i Sasaniyan.
- (5) Akbarnama.
- (6) Zafarnama.

*Poetry*

- (1) Kulliyat-i Sa'di.
- (2) Kulliyat-i Jami.
- (3) Kulliyat-i Nizami.
- (4) Kulliyat-i Zahir-i Faryabi.
- (5) Kulliyat-i 'Atar.
- (6) Kulliyat-i Salman-i Sawji.
- (7) Khamsa-i Nizami.

To the above list other works \* may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu.

The selections shall be prescribed and prepared by the University and be its property.

2. The course shall include Persian Grammar.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall, from time to time, be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The marks shall be distributed as follows:—

*Paper I.*

- |   |     |           |
|---|-----|-----------|
| (a) Questions on Persian Poetry Texts                             | ... | 50 marks. |
| Not more than 25 marks shall be assigned to mere translation.     |     |           |
| (b) Persian Grammar   | ... | 25 marks. |
| (c) Passages of simple English Prose for translation into Persian | ... | 25 marks. |

In (b) passages shall be set for testing the practical application of grammatical rules.

*Paper II.*

- |   |     |           |
|---|-----|-----------|
| (a) Questions on Persian Prose Texts                          | ... | 40 marks. |
| Not more than 20 marks shall be assigned to mere translation. |     |           |

\* For subsequent modifications in the list made by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu *vide* Appendix D.



- (b) Unseen passages for translation from Persian into English ... 35 marks.  
 (c) Passages of simple English Prose for translation into Persian ... 25 marks.

The passages for translation from English into Persian shall in no case be translated portions of the prescribed texts.

Questions on Persian texts shall comprise—

- (a) Passages from the set texts for translation into English,  
 (b) Questions on the subject-matter, and  
 (c) Questions on the language of the text.

The unseen Persian passages shall consist of easy prose and verse not exceeding in difficulty the text prescribed for the Matriculation Examination.

No questions shall be set on Prosody or Rhetoric.

## ARMENIAN

1. The course in Classical Armenian shall consist of—

### *Prose*

Moses of Khoren's History of Armenia, Part II.

### *Poetry*

Elishe Vardapiet Doorian's Course of Classical Armenian, Part II.

The course shall also include Armenian Grammar of which a fuller knowledge will be required than at the Matriculation Examination.

2. The marks shall be distributed as follows:—

### *Paper I.*

- (a) Questions on the Prose Texts ... 40 marks.  
 Not more than 20 marks shall be assigned to mere translation.  
 (b) Questions on Grammar, including passages containing errors for correction ... 20 marks.  
 (c) Passages for translation from English into Armenian. ... 40 marks.

### *Paper II.*

- (a) Questions on the Poetry Texts ... 40 marks.  
 Not more than 20 marks shall be assigned to mere translation.  
 (b) Unseen passages in Armenian for translation into English ... 30 marks.  
 (c) Passages for translation from English into Armenian. ... 30 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall consist of simple prose not exceeding in difficulty the text prescribed for the Matriculation Examination.

## HEBREW

The course in Hebrew shall consist of prescribed selections from Genesis, Isaiah, Ruth and the Psalms.

The marks in the two papers shall be distributed in the same proportions as in the case of Armenian.

## GREEK

1. The course in Greek shall consist of suitable selections from the following prose writers and poets, to be prescribed from time to time, by the Board of Studies concerned:—

Xenophon, Herodotus, Plato, Plutarch, Homer, Euripides and Sophocles.

The course shall also include Attic Greek Grammar.

2. The marks shall be distributed as follows:—

### *Paper I.*

- (a) Questions on the Prose Selections ... 40 marks.  
Not more than 20 marks shall be assigned to mere translation.
- (b) Questions on the Poetry Selections ... 40 marks..  
Not more than 20 marks shall be assigned to mere translation.
- (c) Questions on Grammar ... 20 marks.

### *Paper II.*

- (a) Translation of simple passages from English into Greek ... 30 marks.
- (b) Unseen passages in Greek for translation into English ... 70 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall not exceed in difficulty the selections set for the Matriculation Examination.

## LATIN

1. The course in Latin shall consist of suitable selections from the following prose writers and poets, to be prescribed from time to time, by the Board of Studies concerned:—

Sallust, Cicero Livy, Virgil, Horace.

The course shall also include Latin Grammar.

2. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the Prose Selections ... 40 marks.
- (b) Questions on the Poetry Selections ... 40 marks.
- In neither case shall mere translation of the set texts carry more than 20 marks.
- (c) Questions on Grammar ... 20 marks.

*Paper II.*

- (a) Translation of simple passages from English into Latin ... 40 marks.
- (b) Unseen passages in Latin for translation into English ... 60 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

The unseen passages shall not exceed in difficulty the selections set for the Matriculation Examination.

## FRENCH

1. The course in French shall consist of one work in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned.

The course shall include French Grammar.

2. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the prescribed texts, prose and verse ... 50 marks.
- Not more than 25 marks shall be assigned to mere translation.
- (b) Questions on Grammar ... 20 marks.
- (c) Passages for translation from English into French ... 30 marks.

*Paper II.*

- (a) Unseen passages of French prose and verse for translation into English ... 70 marks.

- (b) Passages for translation from English into French ... 30 marks.

Questions on the texts shall comprise—

- (a) Passages from the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the language of the text.

## GERMAN

1. The course in German shall consist of one work in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned.

The course shall include German Grammar.

2. The marks in the two papers shall be distributed in the same proportions as in the case of French.

## ITALIAN

1. The course in Italian shall consist of three works in prose and selections in verse from one or more writers, which shall be prescribed from time to time, by the Board of Studies concerned.

The course shall include Italian Grammar.

2. The marks shall be distributed as follows:—

### *Paper I.*

- (a) Questions on the prescribed texts, prose and verse ... 50 marks.  
Not more than 25 marks shall be assigned to mere translation.
- (b) Questions on grammar ... 20 marks.
- (c) Passages for translation from English into Italian ... 30 marks.

### *Paper II.*

- (a) Unseen passages of Italian prose and verse for translation into English ... 70 marks.
- (b) Passages for translation from English into Italian ... 30 marks.

Questions on the texts shall comprise—

- (1) Passages from the set texts for translation into English,
- (2) Question on the subject-matter, and
- (3) Questions on the language of the text.

## HISTORY

The subject shall be—

- (i) The History of England, from the earliest times to the present times.
- (ii) The History of Ancient Greece, from the earliest times to the Roman Conquest, 146 B.C.
- (iii) The History of Rome, from the earliest times to the extinction of the Western Empire, 476 A.D.
- (iv) A special period of the History of Hindu Colonial Expansion.
- (v) A special period of the History of Islam outside India.

*Paper I.*—History of England.

*Paper II.*—History of Greece and Rome.

*Or*

A special period of the History of Hindu Colonial Expansion and a special period of the History of Islam outside India.

The periods to be studied in the subject or subjects included under *each* paper may be changed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

## LOGIC

Definition, Scope and Use of Logic. Its relation to Metaphysics and Psychology. Immediate and Mediate knowledge. Reasoning in general. Division of Logic into Formal and Material. Formal Logic. Principles of Formal Reasoning: Identity, Contradiction, Sufficient Reason. Axioms and Postulates. Language and Thought. Realism, Conceptualism and Nominalism, and their bearing on the nature of the logical processes.

Concept and Term. Abstraction. Use of names. Denotation and Connotation. Extension and Intension. Distribution. Definition, with its limits and formal conditions. Logical Division and its conditions. Various Divisions of Terms and their significance.

Judgment and the Proposition. Theory of Predication and Import of Propositions. Essence. Genus. Species. Differential Property. Accident. Quantity and Quality. Modality. Simplification of Propositions. Various Divisions of Propositions and their significance. Opposition of Propositions, and its practical applications.

Inference in general. Immediate and Mediate Inference. Deductive and Inductive Inference.

Immediate Inference, and its different forms. Conversion, Obversion, Contraposition, Inversion, Opposition with their practical applications.

**Deductive Inference.** Premises and Middle Terms. Syllogism: its structure and condition. The canons. Figures and Moods, and their rules. Reductions. Hypothetical and Disjunctive Syllogism with their rules. Dilemma. Compound Syllogism and Trains of Reasoning. Practical application of the Syllogism to express and test reasoning.

**Fallacies in Deductive Reasoning.**

**Material Logic.** Nature of truth. Knowledge and Reality. Sources of Knowledge. Perception. Inference. Authority. Necessary Truth.

**Generalization and the General Idea.**

**Science.** Laws of Nature. Uniformity of Nature.

**The grounds and conditions of Inductive Inference.** Causality. Origin of belief in universal causations. Energy and conservation. Causes and conditions. Plurality of Causes. Composition of Causes, and Intermixture of Effects.

**Discovery and Proof.** Hypotheses, their uses and conditions. Theory. Verification. Observation and Experiment and their uses. The Experimental methods and their use, with examples of their application. Fallacies of Observation.

**Nature, place and use of the Inductive Method.** Perfect and Imperfect, Complete and Incomplete Induction. Inference from Analogy. Inference from simple Enumeration. Inductive Probability; Chance and its Elimination. Scientific Induction. Processes simulating Induction. Fallacies in Inductive Reasoning.

**Classification, Natural and Artificial, and its conditions.** Relation of Classification to Division. Definition, and its material conditions. Description. Type. Errors in Classification and Definition. Terminology and Nomenclature.

**Nature, place and use of the Deductive Method.** Relation of Induction and Deduction; Nature, function and value of the Syllogism. Inductive and Deductive Sciences. The actual Method of Scientific Progress. Demonstration. The World as a system of law. Explanation, and its limits.

## ELEMENTS OF CIVICS AND ECONOMICS

### *First Paper*

#### (a) Principles of Civics

The Individual and Society.

The Family, Clan, Tribe, People and Nation.

The Modern State. The Citizen as a member of the State.

Activities of the State.

Law and Liberty.

Modern Forms of Government.

Merits and Defects of Democracy.  
 Public Opinion: Political Parties.  
 Organs of Government—Legislative, Executive, Judicial.  
 Separation of Functions.  
 Organisation of the Legislature—Executive and Judiciary.  
 Electorate—Its extent and nature.  
 Local Government—Its categories.  
 Citizenship: Rights and Duties: Civic ideals.  
 Nationalism: The League of Nations.

### (b) Elements of Indian Administration

A brief historical background.  
 The Secretary of State for India—His duties and powers.  
 Advisers of the Secretary of State.  
 The Governor-General—His duties and powers.  
 The Federal Executive—Its Composition and Functions.  
 The Federal Legislature—Its Composition and Functions.  
 Central subjects.  
 Indian States—Their Status.  
 Provincial Governments—The Governors—The Provincial Executive—Its composition and functions—Provincial subjects—Provincial Legislatures.  
 The District Administration.  
 The Judicial System.  
 The Services.  
 Revenue and expenditure of the Central Government and the Provincial Governments.  
 Local Self-Government—Municipalities, District Boards, Local or Taluq Boards; Union Boards or Panchayet committees; Constitution and functions; Sources of Revenue and Heads of Expenditure.

### *Second Paper*

#### (a) Elementary Principles of Economics

The Economic Activities of Man—Subject-matter of Economics—Fundamental Concepts—Wealth, Goods, Utility, Value and Price, Demand and Supply.  
 Consumption—Human wants and their satisfaction.  
 The Law of Diminishing Utility.  
 Total and Marginal Utility.  
 Production—Factors: Land, Labour, Capital, Organisation; Land and the influences affecting its productivity; Labour; its efficiency; Division of Labour; Capital—The different forms.

Business ability and enterprise in relation to production. Large-scale and small-scale production, localization of Industry, Laws of Diminishing, Constant and Increasing Returns.

Exchange—Barter, Money, Standard and Token Money, Paper Money, Prices.

Functions of a Bank: Credit Instruments.

Foreign Trade: Protection and Free Trade.

Distribution—Rent, Wage, Interest, Profit.

Public Finance—Revenue and Expenditure, Taxation, its main principles: Direct and Indirect Taxes; Public Debt.

### (b) Indian Economics

The natural environment—The geographical situation.

Natural Divisions—Climate. The Monsoons, Soils, Mineral Resources.

The Social Structure—Total population, Density, Towns and Villages, Health, Birth rate, Death rate, Migration, the Caste System, the Joint Family.

Production—Agriculture—Special condition of Land; Agricultural indebtedness.

The Co-operative System: Irrigation: Land Settlements. The harvests; Chief Crops; Causes of the backwardness of Indian Agriculture; Fruit Growing; Sericulture; Arboriculture; Mineral Production. Manufactures, small-scale and large-scale industries. Labour conditions in Agriculture and in Industry.

Distribution—Conditions determining rent. Cash rents and Corn rents; Wages, nominal and real. Interest and profits.

Exchange—Inland Trade and Transport; Railways; Roads; Waterways; Aviation; Foreign Commerce; Imports; Exports—Trade with principal Countries; Shipping; The balance of Trade, Free Trade and Protection. Imperial Preference.

Currency and Banking—A descriptive outline of the present currency system of India. Different types of Banks.

Consumption—Wants and activities. The Standard of Life. Effects of consumption on production.

Economic Activities of the State—State and Agriculture, State and Industry. Famines—relief and prevention, Revenue and Expenditure, Taxation, Public debt.

### COMMERCIAL GEOGRAPHY

Students of Commercial Geography will be expected to possess a knowledge of General Geography up to the Matricula-



tion standard. The course in Commercial Geography shall be divided into two papers—one paper to be devoted to countries other than India and the other exclusively to India.

*General Economic Geography*:—The bases of Commercial Geography. Its relation to other Sciences. Trade winds and ocean currents. The Geographical distribution of commercial products. Physical conditions affecting their production. Commodities dependent on climate. Monsoons. Agricultural products. Forests and fisheries. Mineral products. Manufactures.

*Regional Economic Geography*:—Trade routes. Means of transport and communication. Ports and harbours. Industrial town and commercial centres. Chief products of important countries—agricultural, mineral and manufactured. Principal imports and exports.

*India*:—Detailed study of physical features—Climate, Monsoons—Soils and soil erosion—Location of chief agricultural, industrial and mineral products—Movements of trade, internal and foreign—Transport and communications. Competition between waterways and land transport. Ports and harbours.

## COMMERCIAL ARITHMETIC AND ELEMENTS OF BOOK-KEEPING

### *Commercial Arithmetic*

#### 1. Principles of Arithmetic. Commercial Arithmetic.

- (a) Arithmetical Operations.
- (b) Integers—Fractions: Vulgar and Decimal.
- (c) Contracted Methods of Multiplication, Division and Square root—Decimalisation of money—Calculation of cost.
- (d) Ratio—Proportion—Proportional parts—Percentage—Averages and Statistics.
- (e) Simple Mensuration—Squares, Rectangles, Triangles and Rectilineal figures—Circles, Segments, Sectors—Prisms, Cylinders—Pyramids—Cones—Spheres—Simple Equations and their application to Inverse Problems. Application to Inverse Problems.
- (f) Indian, British and Metric Systems of Weights and Measures.
- (g) Logarithms and their applications
- (h) Mixtures—Profit and Loss.

#### II. Trade.

##### (a) Inland Trade—

- (1) Invoices and Bills.

- (2) Payment for Goods.
- (3) Percentage—Gains and Losses.
- (4) Partnerships—Bankruptcies.
- (b) Import Trade—
  - (1) Importing Operation.
  - (2) Expenses incurred.
  - (3) Customs and Excise.
- (c) Export Trade—
  - (1) Methods of Exporting Goods.
  - (2) Kinds of Invoices and their Preparation.
  - (3) Foreign Weights and Measures.
  - (4) Tables of Equivalents and Values.
  - (5) Foreign Currency.

### III. Finance.

- (a) Coinage Systems—
  - (1) Mint Par of Exchange.
  - (2) Specie Point.
- (b) Banking and Exchange—
  - (1) Payments through Post Office, the Treasury and the Banks.
  - (2) Bills of Exchange—Telegraphic Transfers—Promissory Notes.
  - (3) Discount—True, Banker's, Commercial—Discounting and Retiring of Bills.
  - (4) Function of a Bill of Exchange.
  - (5) Foreign Exchanges—Course of Exchange.
  - (6) Current Accounts.
- (c) Stock Exchange—
  - (1) Stock Exchange Transactions—Stocks and Shares.
  - (2) Contango and Backwardation.
  - (3) Speculation.
  - (4) London Stock Exchange—Calcutta Stock Exchange.
- (d) Annuities—
  - (1) Interest, Simple and Compound.
  - (2) Discount, Present Worth and Amount.
  - (3) Commission and Brokerage.
  - (4) Kinds of Annuities.
  - (5) Amount and Present Value of an Annuity.
  - (6) Leases and Sinking Funds.
  - (7) Life Annuities.

*Elements of Book-keeping*

1. Book-keeping—Its Principles.
  - (a) Double Entry—Its theory, scientific methods, adaptability to all classes of commercial transactions.
  - (b) Single Entry—Its meaning, principles and defects.
2. Books of Accounts—
  - (a) Journal.
  - (b) Ledger.
  - (c) Cash Book (with or without Bank and Discount columns).
  - (d) Bought, Sold and Bill Books.
3. Methods of Book-keeping—
  - (a) Journalising.
  - (b) Posting.
4. Preparation of Accounts and Balance Sheet—
  - (a) Trial Balance.
  - (b) Journalising adjustment—Depreciation, Bad Debts, Outstanding Incomes and Expenses. Expenses in Advance, Writing off, Fictitious Assets, and creating Reserve Accounts.
  - (c) Journalising Closing Entries.
  - (d) Closing the Ledger.
  - (e) Preparation of Manufacturing Account, Trading Account, Profit and Loss Account. Profit and Loss Appropriation Account.
  - (f) Preparation of the Balance Sheet.
5. Distinction between Receipts and Payments, Account and Revenue Accounts, items of Receipts and Payments and items of Income and Expenditure on the one hand, and of Assets and Liabilities on the other.
6. Treatment of Transactions connected with—
  - (a) Bills of Exchange and Promissory Notes.
  - (b) Goodwill.
  - (c) Consignments, outwards and inwards.
7. Partnerships Accounts (with the exception of dissolution or winding up of a partnership business)—Proprietors' Current Account.
8. Company Accounts (without the use of the Private Ledger)—
  - (a) Formation of Joint-Stock Companies—Difference between a firm and a Joint-Stock Company—Difference

between a Joint-Stock Company with Limited Liability and one with Unlimited Liability—Difference between a Public Limited Company and a Private Limited Company—Memorandum and Articles of Association, and Prospectus.

(b) Statistical Books which a Joint-Stock Company must keep in order to comply with the requirements of the Indian Companies Act.

(c) Entries relating to Shares—

(1) Application, Allotment and Calls.

(2) Forfeited Shares.

(3) Transfer of Shares.

(d) Preparation of Accounts and Balance Sheet, with easy adjustments.

9. Explanation of the following Commercial Terms—

Account, Debtor, Creditor, Debit, Credit, Balance, Gross and Net Profit, Interest, Discount, Asset, Liability, Capital, Trial Balance, Balance Sheet, Solvent, Insolvent, Composition, Bad Debts, Posting Folio, Petty Cash, Cheque, Bill of Exchange, Accepting, Honouring, Dishonouring, Discounting, Noting, Retiring, Invoice Receipt Voucher, Debit Voucher, Debit Note, Credit Note, Rebate, Commission, Account Sales, Depreciation, Premium, Provision, Charges, Brokerage, Bill of Sale, Personal Account, Impersonal Account, Real Account, Nominal Account.

### GENERAL

1. In order to pass the Intermediate Examination in Arts a candidate must obtain—

In English ... 108 marks.

In the Vernacular or the alternative paper ... 36 marks.

In each of the subjects taken up under Group B of Section 7 (3), (4) and (5):—

In the two theoretical papers ... 40 marks.

In the practical paper ... 20 marks.

In each of the remaining compulsory subjects taken up ... 60 marks.

And in the aggregate ... 340 marks.

2. In order to be placed in the first division a candidate must obtain 500 marks.

In order to be placed in the second division, 400 marks.

The names of candidates placed in the first division shall be published in order of merit.

If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 60 obtained by him in the

optional subject, if any, shall be added to his aggregate and the aggregate so obtained shall determine his division and his place in the list.

3. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 500 in the aggregate, shall be allowed to pass. In order to determine the division in which such a candidate will be placed and his place in the division, the number of marks by which he has failed in one subject shall be deducted from his aggregate.

4. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

5. Candidates who, after passing the Intermediate Examination in Science, appear for the Intermediate in Arts, shall be required, in order to pass, to obtain 36 per cent. in each subject for which they present themselves in the latter examination. Provided that in a Science subject they must obtain pass marks both in the theoretical papers and in the practical paper.

## CHAPTER XXXII

### BACHELOR OF ARTS

1. An examination for the degree of Bachelor of Arts shall be held annually in Calcutta, and at such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to the examination provided he has prosecuted a regular course of study for not less than two academical years after passing the Intermediate Examination in Arts or Science in a College or Colleges affiliated to the University in the subjects which the candidate takes up.

3. Every candidate sent up for the B.A. Examination by an affiliated College shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests, and (d) of probability of passing the examination. Every candidate shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate at least six weeks before the date fixed for the commencement of the Examination. If he desires to be examined for Honours in any subject, he shall name the subject in his application. If a candidate offers himself for examination in Hebrew, Armenian, French or German, he shall be required to give the Registrar notice of the fact twelve months before the date of the examination.

4. A fee of Rs. 45 shall be forwarded by each candidate with his application, provided that a candidate who applies for admission to the Honours Examination shall pay an additional fee of Rs. 10.

A candidate who fails to pass, or to present himself for examinations shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to one or more subsequent Examinations for the Degree of Bachelor of Arts on payment of a like fee of Rs. 45 or Rs. 55 as the case may be on each occasion, subject to the provisions of Sections 4B and 4C.

Provided that if a candidate who has passed the B.A. or the B.Sc. Examination and is prosecuting his studies for a higher examination or other examination in a College affiliated to this University or in the University Post-Graduate Classes, is required by the University to appear in a special subject at the B.A. Examination, he shall pay a reduced fee of Rs. 23 for the

Pass Course and Rs. 28 for the Honours Course, as the case may be.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a Science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other affiliated College or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or present

himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or, with the permission of the Syndicate, from the Principal of any other College affiliated to the University, that he has passed the test examination held by such a College immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a College or from a Member of the Senate testifying to his good character during the intervening period. Provided further that in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said College or of any other College or from some other authority approved by the Syndicate to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself. Provided also that no student who has been unsuccessful at the examination in an Honours subject will be allowed to take up Honours course unless he prosecutes a regular course of study for one academical year immediately preceding his admission to the examination in the Honours subject.

Second, third and fourth paragraphs of Section 4A above should apply to students referred to in the above paragraph.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the College at which he last studied or from a member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other College affiliated to the University in that subject or from some



other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself:

Provided also that no student, who has been unsuccessful at the examination in an Honours subject, shall be allowed to appear for re-examination in the Honours Course in that subject.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The examination for the degree of Bachelor of Arts shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. Every candidate shall be examined in the following subjects:—

(1) English.

(2) One of the following Vernaculars:—Bengali, Hindi, Uriya, Assamese, Burmese, Urdu, Modern Armenian, Nepali, Maithili, Modern Tibetan, Khasi, Marathi, Gujrathi, Telugu, Tamil, Kanarese, Malayalam, Sinhalese, Sindhi, Portuguese.

The Syndicate shall have power to add to this list.

For candidates whose vernacular is English or an Indian vernacular not included in this list, there shall be an advanced paper in English which shall be treated as separate from the Examination in English.

(3) and (4) Two of the following subjects, one of which at least must belong to Group A:—

#### A

(I) One of the following languages:—Sanskrit, Pali (including a knowledge of Sanskrit up to the Matriculation standard), Arabic, Persian (including a knowledge of Arabic up to the Intermediate standard for Honours Course only), Hebrew, Classical Armenian, Greek, Latin, French, German, Italian, Syriac, Bengali, Assamese, Urdu and Hindi.

(II) History.

(IIA) Indo-Islamic and World History.

(IIB) Islamic History and Culture.

(IIC) Ancient Indian and World History.

[Each of the subjects (II, IIA, IIB, IIC) shall be regarded as a separate subject, provided always that no candidate shall be allowed to take up more than one of these subjects, namely, II, IIA, IIB, and IIC.]

(III) Political Economy and Political Philosophy.

(IV) Mental and Moral Philosophy.

(V) Mathematics.

(VI) Linguistics.

||

(I) Physics.

(II) Chemistry.

(III) Physiology.

(IV) Botany.

(V) Zoology.

(VI) Anthropology.

(VII) Psychology.

(VIII) Geography.

(IX) Statistics.

(X) Geology.

No candidate shall be allowed to take up Mental and Moral Philosophy unless he has taken up Logic in the Intermediate Examination in Arts. No candidate shall be allowed to take up any subject in Group B or Mathematics, who has not taken up the corresponding subject in the Intermediate Examination. Provided that a student may be allowed to take up Psychology if he has taken up any one of the following subjects in the Intermediate Examination—Psychology, Physiology, Biology or Physics. Provided further that no student shall be permitted to take up Botany if he has not taken up Botany or Biology for the Intermediate Examination: Provided also that no candidate shall be allowed to take up Statistics for the B.A. Examination if he has not taken up Mathematics for the Intermediate Examination.

No candidate shall be allowed to take up Mental and Moral Philosophy along with Psychology.

7. A candidate may take the Pass Course in four subjects or he may take the Pass Course in three subjects and the Honours Course in one subject only; but there shall be no Honours Course in the Vernacular.

8. There shall be three papers in the Pass Course and six papers in the Honours Course in every subject except the Vernacular. In that subject only one Pass paper shall be set. Each paper shall be of three hours and shall carry 100 marks.

9. In the syllabuses hereinafter defined Papers I, II and III shall be on the Pass Course, but questions set for Honours candidates need not be identical with those set for Pass candidates. Papers IV, V and VI shall be for Honours candidates only.

10. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed in the Pass Course, arranged in alphabetical order, together with a list of those who have obtained Honours in each branch, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any class or distinction. Each successful candidate shall receive with his degree of B.A. a certificate in the form entered in Appendix A.

11. The syllabuses in Mathematics and in the subjects under Group B shall be identical in the B.A. and B.Sc. Examinations and will be found under the B.Sc. Regulations.

There shall be a practical examination in all subjects included in Group B.

12. The following syllabuses define the subjects prescribed for the B.A. Examination. Books shall be recommended, where necessary, by the Board of Studies concerned.

### ENGLISH

1. In Papers I, II, IV and V, not more than half the marks shall be given for explanation of passages set from the prescribed texts.

2. In these papers, questions may be asked to test the candidate's appreciation of the books he has studied in the course, but questions encouraging the mere reproduction of literary criticisms shall not be set.

3. The subjects and marks shall be respectively divided as follows:—

#### *Paper I.*

Poetry and Drama texts ... 100 marks.

#### *Paper II.*

Prose texts ... 100 marks.

In regard to the subject of these two papers students shall be expected to possess a general knowledge of the life and literary career of the authors whose works are prescribed.

#### *Paper III.*

(a) Essay ... 50 marks.

- (5) Unseen passages from authors or works of the same standard of difficulty as those prescribed for the Intermediate Examination ... 50 marks.

4. Additional Honours Papers.

*Paper IV.*

- (a) Additional Poetry and Drama texts ... 75 marks.  
 (b) Additional unseen passages in Poetry and Drama ... 25 marks.

*Paper V.*

- (a) Additional Prose texts ... 75 marks.  
 (b) Additional unseen passages in Prose ... 25 marks.

In Papers IV and V the unseen passages shall not be of a higher standard of difficulty than the prescribed texts.

*Paper VI.*

- (a) General History of English Literature ... 40 marks.  
 (b) Study of Special Authors ... 30 marks.  
 (c) Philology of the English Language ... 30 marks.

5. No texts or unseen passages shall be taken from Spenser or from authors earlier than the Elizabethan period.

## VERNACULARS

1. The course in Vernacular shall include select texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies concerned.

The Syndicate shall also draw up, on the recommendation of the Board, a small selection of books by notable authors as showing the standard up to which students will be expected to have read.

2. The examination shall include—

- (a) Questions on the subject-matter and on the language of the prescribed texts ... 40 marks.  
 (b) An unseen passage to be summarised or amplified in the Vernacular ... 15 marks.  
 (c) Translation from English into Vernacular 15 marks.  
 (d) Questions on Composition ... 10 marks.  
 (e) An Essay in Vernacular—headings being given ... 20 marks.

3. (a) The unseen passage shall not exceed in difficulty the Vernacular texts prescribed for the examination.

(b) Questions shall not be set on the history of language or literature of the Vernacular.

4. The Alternative Paper in English (for candidates whose Vernacular is a language not included in the prescribed list) shall include:

(a) Questions on selected texts in prose and verse to be prescribed by the Syndicate on the recommendation of the Board of Studies in English; and

(b) Questions on composition including Rhetoric and Prosody.

5. A candidate who takes Bengali, Assamese, Urdu or Hindi as a subject, under Group A (I) in sub-sections (3) and (4), Section 6, will be examined in an additional paper in vernacular, in lieu of the compulsory paper, as outlined in sub-section (2). The marks in that paper shall be distributed as follows:—

*Bengali, Assamese and Hindi*

History of Literature	...	...	40 marks.
History of Language	...	...	30 marks..
Essay	...	...	30 marks..

*Urdu*

History of Literature	...	...	50 marks.
History of Language	...	...	25 marks.
Essay	...	...	25 marks.

ALTERNATIVE PAPER IN ENGLISH

The special paper shall be a test in English Composition and on a general knowledge of the subject-matter of a small number of standard works in English (not exceeding three) to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies in English.

SANSKRIT

The Pass Course in Sanskrit shall comprise the following:—

*Paper I.*

- (a) Poetry texts, namely, selected portions of  
Manu and selected portions of one of  
the following:— ... 75 marks..

Kiratarjuniya  
Sisupalabadha

- (b) Translation from English into Sanskrit ... 25 marks..

*Paper II.*

- (a) Drama texts, namely, two of the following \*:— ... 75 marks.

Sakuntala  
Uttararamacharita  
Mudrarakshasa  
Ratnavali

- (b) Translation from English into Sanskrit ... 25 marks.

*Paper III.*

- (a) Prose passages from unprepared Sanskrit books for translation into English ... 30 marks.  
(b) Questions on Sanskrit Grammar including passages for correction ... 40 marks.  
(c) Outlines of the History of Sanskrit Literature 30 marks.  
The Honours Course in Sanskrit shall comprise, in addition to the Pass Course, the following:—

*Paper IV.*

- (a) Selected portions of Bhattikavya and Kadambari ... 75 marks.  
(b) Translation from English into Sanskrit ... 25 marks.

*Paper V.*

- Selected Hymns from the Rigveda, with Sayana's Commentary thereon ... 100 marks.

*Paper VI.*

Grammar and Rhetoric, namely—

- (a) Siddhanta Kaumudi—Kataka and Samasa 60 marks.  
(b) Dandi—Kavyadarsa. Sahitya Darpan, Chapter VI ... 40 marks.

In the first, second, fourth and fifth papers, the questions on the text shall include—

- (i) Passages from the prescribed texts for translation into English (to carry not more than 25 marks in any paper).
- (ii) Questions on the subject-matter and on the language of the prescribed texts.
- (iii) Questions on Grammar and Prosody (but not Rhetoric), arising out of the prescribed texts.
- (iv) Passages for translation or discussion in English, taken from standard Sanskrit commentaries on the prescribed texts, to be named by the Syndicate from time to time.

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\* The following work has been added by the Syndicate on the recommendation of the Board of Studies in Sanskrit :—Bhāsa's *Swapna-Vāsavadattā*.

In the third paper the unseen passages shall not exceed in difficulty the prose texts set for the Intermediate Examination in Arts.

The Syndicate shall from time to time cause to be prepared and prescribed a text-book in Sanskrit Grammar.

In the sixth paper, questions will be set to test the ability of candidates to apply (a) the Rules of Panini on Karaka and Samasa and (b) the rules of Rhetoric to passages taken from the prescribed texts.

The Syndicate shall, upon the recommendation of the Board of Studies, select the texts in accordance with the syllabus and may also recommend books or specify editions to indicate more fully the extent and standard of knowledge required in any paper.

The Syndicate shall have power to add to the list of specified books other books from time to time on the recommendation of the Board of Studies in Sanskrit.

### BENGALI

The Pass course in Bengali shall comprise the following:—

#### *Paper I.*

Poetry Texts	...	...	80 marks.
Metrics	...	...	20 marks.

#### *Paper II.*

Prose Texts	...	...	75 marks.
Criticism	...	...	25 marks.

#### *Paper III.*

Drama Texts	...	...	80 marks.
Rhetoric	...	...	20 marks.

The Honours course in Bengali shall comprise, in addition to the Pass course, the following:—

#### *Paper IV.*

Additional Poetry Texts	...	...	80 marks.
Unseens	...	...	20 marks.

#### *Paper V.*

Additional Prose Texts	...	...	80 marks.
Unseens	...	...	20 marks.

#### *Paper VI.*

Additional Drama Texts	...	...	80 marks.
Unseens	...	...	20 marks.

## HINDI

The Pass course in Hindi shall comprise the following:—

*Paper I.*

Poetry Texts	...	...	80 marks.
Metrics	...	...	20 marks.

*Paper II.*

Prose Texts	...	...	75 marks.
Criticism	...	...	25 marks.

*Paper III.*

Drama Texts	...	...	80 marks.
Rhetoric	...	...	20 marks.

The Honours course in Hindi shall comprise, in addition to the Pass course, the following:—

*Paper IV.*

Additional Poetry Texts	...	...	80 marks.
Unseens	...	...	20 marks.

*Paper V.*

Additional Prose Texts	...	...	80 marks.
Unseens	...	...	20 marks.

*Paper VI.*

Additional Drama Texts	...	...	80 marks.
Unseens	...	...	20 marks.

## URDU

The Pass Course in Urdu shall comprise the following:—

*Paper I.*

(a) Old Poetry Texts	...	50 marks.
(b) Modern Poetry Texts	...	50 marks.

*Paper II.*

(a) Prose Texts (Old and Modern)	...	75 marks.
(b) Translation from English into Urdu	...	25 marks.

*Paper III.*

(a) Drama	...	80 marks.
(b) Rhetoric	...	20 marks.

The Honours Course in Urdu shall comprise, in addition to the Pass Course, the following:—

*Paper IV.*

(a) Additional Poetry Texts	...	80 marks.
(b) Unseens (Poetry)	...	20 marks.



*Paper V.*

(a) Additional Prose Texts	...	...	80 marks.
(b) Unseens (Prose)	...	...	20 marks.

*Paper VI.*

(a) Principles of Literary Criticism	...	...	50 marks.
(b) Prosody	...	...	20 marks.
(c) Essay in Urdu	...	...	30 marks.

## ASSAMESE

The Pass Course in Assamese shall comprise the following:—

*Paper I.*

Drama Texts	...	...	75 marks.
Rhetoric and Grammar	...	...	25 marks.

*Paper II.*

Old Poetry Texts	...	...	50 marks.
Modern Poetry Texts	...	...	50 marks.

*Paper III.*

Prose Texts (Old and Modern)	...	...	80 marks.
Translation from English into Assamese	...	...	20 marks.

## ARABIC

1. The Pass Course in Arabic shall comprise \* the whole or selected portions of the following works:—

Any or all of the following works:—

- (1) Majmaul-Bahrayn, by Yaziji.
- (2) Fakehatul Khualfa, by Ibn Arab Shah.
- (3) al-Akhbarul Tiwal, by Dinawari.
- (4) Almustatraf, by Abshahi.
- (5) Tarikhul Yemini.
- (6) Diwan, by Ibn-al-Nabih.
- (7) Diwan, by Abi Firas.
- (8) Jawahirul Balaghat, by Hashimi.
- (9) Majmu'ul Adab, by Yaziji.
- (10) Majaniul Adab, Parts V and VI.
- (11) Nukhabul Mulah, Parts IV and V.
- (12) Hamasa.
- (13) Diwans of Mutanabbi.
- (14) Abul Atahiya.
- (15) Quran with Jalalayan.
- (16) Hariri.
- (17) Tarikh-i-Tabari.
- (18) Quazwini's Geography.

\* For modification in the list of books made by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu vide Appendix D.

The course shall include Arabic Grammar, according to the modern method.

2. The Honours Course shall include \* in addition to the above, the whole or selected portions of the following works:—

- (1) Tafsir, by Abu'l Sa'udal-Imadi.
- (2) Al Jamius Saghir, by Suyuti.
- (3) Al Iqdul Farid, by Ibn Abd Rabbihi.
- (4) Muqaddima, by Ibn Khaldun.
- (5) Qalaidul-Iqyan, by Iban Khaqan.
- (6) Asbabut-Tarab, by Shaikhu.
- (7) Mukhtasaru'i-Maani, by Taftazani.
- (8) Al Mufaddaliyyat, by Dabbi.
- (9) Diwan, by Imraul Quis.
- (10) Diwan, by Khansa.
- (11) Sab'a Muallaqat.
- (12) Banat Suad.
- (13) Ibn-i-Farid.
- (14) Quran with Baydawi and Zamakhshari.
- (15) Sirah Ibn Hisham.

The Honours Course shall also include the elements of Arabic Prosody and Rhetoric, the outlines of Mahomedan History down to the fall of the Abbasaïd Caliphate and a general knowledge of the History of Arabic Literature.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The subjects and the marks shall be distributed as follows:—

#### PASS COURSE

<i>Paper I</i> —(a) Questions on the Poetry texts	80 marks.
(b) Elementary Rhetoric	... 20 marks.
<i>Paper II</i> —(a) Questions on the Prose texts	... 70 marks.
(b) Translation from English into Arabic	... 30 marks.
<i>Paper III</i> —(a) Unscen Prose and Poetry Passages	... 50 marks
(b) Outlines of the History of Arabic Literature	... 50 marks

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\* For modification in the list of books made by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu *vide* Appendix D.

The unseen passages in this paper shall be of no greater difficulty than the texts prescribed for the Intermediate Examination.

### HONOURS COURSE

<i>Paper I</i> —(a) Questions on the Pass Poetry texts	... 80 marks.
(b) Elementary Prosody	... 20 marks.
<i>Paper II</i> —(a) Questions on the Pass Prose texts	70 marks.
(b) Translation from English into Arabic	... 30 marks.
<i>Paper III</i> —(a) Unseen Prose and Poetry Passages	... 50 marks.
(b) Outlines of the History of Arabic Literature	... 50 marks.
<i>Paper IV</i> —Questions on the additional Poetry texts	... 100 marks.
<i>Paper V</i> —(a) Questions on the additional Prose texts	... 80 marks.
(b) Elementary Rhetoric	... 20 marks.
<i>Paper VI</i> —(a) Outlines of the History of Islam to the end of the reign of al-Ma'mun	... 50 marks.
(b) Translation from English into Arabic	... 20 marks.
(c) An Essay in English or Arabic on a subject connected with the History of Islam or the History of Arabic Literature	... 30 marks.

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to mere translation of the set passages.

### PERSIAN

1. The Pass Course in Persian shall comprise \* the whole or selected portions of the following works:—

\* For modification in the list of books made by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu *vide* Appendix D.

Any or all of the following works:—

*Prose*

- (1) The Siyasat Nama of Nizam-ul-Mulk.
- (2) The Shamsa wa Qahqaha.
- (3) The Tarikh-i-Jahangusha-i-Nadiri.
- (4) The Waqaya-i Nimat Khan-i' Ali.
- (5) The Masalikul Muminin.
- (6) The Arud-i-Saifi.

*Poetry*

- (1) The Shahnama of Firdausi.
- (2) The Diwan Hafiz.
- (3) The Masnawi of Jalal-uddin Rumi.
- (4) The Kulliyat of Qaani.
- (5) The Diwan-i wisal-i Shirazi.
- (6) The Naldaman of Faiqi.

The Pass Course shall include the elements of Persian Prose and Rhetoric.

2. The Honours Course shall include \*, in addition to the above, the whole or selected portions of the following works:—

*Prose*—(1) Insha-i Abulfadl. (2) Miraj-us Saadat. (3) Chahar Maqala of Arud-i Nizami. (4) Insha-i Tahir-i Wahid.

*Poetry* (1) Gulshan-i Raz. (2) Diwan-i Sail. (3) Makhzan-ul Asrar.

The Honours Course shall also include the outlines of Mahomedan History in so far as it relates to Persia, Central Asia and India and the History of Persian Literature.

The Board of Studies concerned may make such modification in the list of books as may seem to them desirable.

The scope of the subject of each paper shall from time to time be defined by the Board concerned and the distribution of the marks may be modified in such manner as may seem desirable to the Board.

3. The subjects and the marks shall be distributed as follows:—

PASS COURSE

<i>Paper I</i> —(a) Questions on the Poetry texts	75 marks.
(b) Elementary Rhetoric and Prosody	... 25 marks.

\* For modification in the list of books made by the Syndicate on the recommendation of the Board of Studies in Arabic, Persian and Urdu vide Appendix D.

<i>Paper II</i> —(a) Questions on the Prose texts ...	70 marks.
(b) Translation from English into Persian ...	30 marks.
<i>Paper III</i> —(a) Unseen Prose and Poetry Passages ...	50 marks.
(b) Outlines of the History of Persian Literature ...	50 marks.

The unseen passages in this paper shall be of no greater difficulty than the texts prescribed for the Intermediate Examination.

#### HONOURS COURSE

<i>Paper I</i> —(a) Questions on the Pass Poetry texts ...	80 marks.
(b) Elementary Prosody ...	20 marks.
<i>Paper II</i> —(a) Questions on the Pass Prose texts ...	70 marks.
(b) Translation from English into Persian ...	30 marks.
<i>Paper III</i> —(a) Unseen Prose and Poetry passages ...	50 marks.
(b) Outlines on the History of Persian Literature ...	50 marks.
<i>Paper IV</i> —Questions on the Honours Poetry texts ...	100 marks.
<i>Paper V</i> —(a) Questions on the Honours Prose texts ...	80 marks.
(b) Elementary Rhetoric ...	20 marks.
<i>Paper VI</i> —(a) Outlines of the History of Islam in Iran and India ...	50 marks.
(b) Translation from English into Persian ...	20 marks.
(c) An Essay in English or Persian on a subject connected with the History of Islam or the History of Persian Literature ...	30 marks.

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,
- (b) Questions on the subject-matter, and
- (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## PALI

1. The Pass course in Pali shall consist of such pieces of Prose and Poetry as may be prescribed by the Syndicate on the recommendation of the Board of Studies concerned from the following works:—

*Poetry*

- (a) Samyutta Nikaya.
- (b) Dhammapada.

*Prose*

- (a) Majjhima Nikaya.
- (b) Atthakathas.
- (c) Milindapanha.
- (d) Pancatantra (Sanskrit).

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

The course shall include an elementary knowledge of Sanskrit and Prakrit Grammar, besides a knowledge of Pali Grammar and the elements of Comparative Philology.

2. The Honours course shall, in addition to the above, consist of selected portions of the following works:—

*Poetry*

- (a) Theru- and Theri-gatha.
- (b) Sutta Nipata.
- (c) Saundarananda Kavya.
- (d) Pali Chronicles.

*Prose*

- (a) Digha Nikaya.
- (b) Vibhanga (of the Abhidhamma-pitaka.)
- (c) Vinaya Pitaka (Culla-vagga).
- (d) Samantapasadika (Introduction).

To the above list other works may, from time to time, be added by the Syndicate on the recommendation of the Board of Studies concerned.

The Honours course shall include a knowledge of Sanskrit Grammar up to the Intermediate standard and of the History of Buddhism with special reference to India.

The subjects and the marks shall be distributed as follows:—

*Paper I.*

- |   |               |
|---|---------------|
| (a) Questions on the Poetry texts                               | ... 70 marks. |
| (b) Unseen passages of Pali Poetry for translation into English | ... 30 marks. |

*Paper II.*

- (a) Questions on the Prose texts ... 70 marks.  
 (b) Unseen passages of Pali Prose for translation into English ... 30 marks.

*Paper III.*

- (a) Questions on Sanskrit Grammar ... 15 marks.  
 (b) Questions on Pali Grammar ... 15 marks.  
 (c) Questions on Prakrit Grammar ... 15 marks.  
 (d) Questions on Comparative Philology ... 30 marks.  
 (e) Simple English passages for translation into Pali ... 25 marks.

*Paper IV.*

- (a) Questions on the additional Poetry texts ... 40 marks.  
 (b) Unseen passages of Pali Prose for translation into English ... 30 marks.  
 (c) Questions on Sanskrit Grammar ... 30 marks.

*Paper V.*

- (a) Questions on the additional Prose texts ... 40 marks.  
 (b) Unseen passages for translation into English ... 30 marks.  
 (c) Questions on Prakrit Grammar ... 30 marks.

*Paper VI.*

- (a) Questions on the History of Buddhism ... 70 marks.  
 (b) Questions on Comparative Philology ... 30 marks.

In Papers I, II, IV and V, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,  
 (b) Questions on the subject-matter, and  
 (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## HEBREW

1. The Pass Course in Hebrew shall comprise specified portions of the Historical books, the Psalms and Proverbs. The course shall include Jewish History.

2. The Honours Course shall include, in addition to the above, two Prophetical books, and the History of the Hebrew Language and Literature.

3. The marks shall be distributed as follows:—

*Paper I.*

- (a) Questions on the specified Historical texts 70 marks.

- (b) Unseen passages from Historical books for translation into English ... 30 marks.

*Paper II.*

- (a) Questions on the Psalms and Proverbs ... 70 marks.  
 (b) Unseen passages from poetical books for translation into English ... 30 marks.

*Paper III.*

- (a) English Passages for translation into Hebrew 50 marks.  
 (b) Questions on the History of the Jews, and on the literary history of the Bible ... 50 marks.

*Paper IV.*

- (a) Questions on the specified Prophetical books 70 marks.  
 (b) English passages for translation into Hebrew 30 marks.

*Paper V.*

- (a) Unseen passages from the Historical books for translation into English ... 40 marks.  
 (b) Unseen passages from the Prophetical books for translation into English ... 30 marks.  
 (c) English passages for translation into Hebrew 30 marks.

*Paper VI.*

- (a) Questions on the Hebrew Language and Literature ... 50 marks.  
 (b) Questions on Jewish History ... 50 marks.

In Papers I, II and IV, questions on the texts shall comprise—

- (a) Passages of the set texts for translation into English,  
 (b) Questions on the subject-matter, and  
 (c) Questions on the Grammar of the set passages.

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## ARMENIAN

1. The Pass Course in Armenian shall consist of the following texts:—

### *Poetry*

Bagratounie's translation of "Paradise Lost," Books IX, X, XI, XII.

### *Prose*

Agathangalo's History, Parts I and III, Moses of Khoren's History.

The course shall include the History of Armenia.



2. The Honours Course shall include in addition to the above—

*Poetry*

Bagratounie's Haik Dientsazn, Books I, II, III, IV and V.

*Prose*

John Catholicus.

Elishe.

The course shall include the History of Armenian Literature and the elements of Armenian Philology.

The marks shall be distributed as follows:—

*Paper I.*

- |   |     |           |
|---|-----|-----------|
| (a) Questions on the Poetry texts                                   | ... | 70 marks. |
| (b) Unseen passages of Armenian Poetry for translation into English | ... | 30 marks. |

*Paper II.*

- |  |     |           |
|--|-----|-----------|
| (a) Questions on the Prose texts                                   | ... | 70 marks. |
| (b) Unseen passages of Armenian Prose for translation into English | ... | 30 marks. |

*Paper III.*

- |  |     |           |
|--|-----|-----------|
| (a) English passages for translation into Classical Armenian | ... | 50 marks. |
| (b) Questions on Armenian Grammar                            | ... | 20 marks. |
| (c) Questions on the History of Armenia                      | ... | 30 marks. |

*Paper IV.*

- |  |     |           |
|--|-----|-----------|
| (a) Questions on the additional Poetry texts       | ... | 70 marks. |
| (b) English passages for translation into Armenian | ... | 30 marks. |

*Paper V.*

- |  |     |           |
|--|-----|-----------|
| (a) Questions on the additional Prose texts        | ... | 70 marks. |
| (b) English passages for translation into Armenian | ... | 30 marks. |

*Paper VI.*

- |  |     |           |
|--|-----|-----------|
| (a) Unseen passages in Armenian for translation into English | ... | 40 marks. |
| (b) Questions on the History of Armenian Literature          | ... | 30 marks. |
| (c) Questions on Armenian Philology                          | ... | 30 marks. |

In Papers I, II, IV and V, questions on the texts shall comprise—

- |   |
|---|
| (a) Passages of the set texts for translation into English, |
| (b) Questions on the subject-matter, and                    |
| (c) Questions on the Grammar of the set passages.           |

In no paper shall more than one-fourth of the marks of these questions be assigned to the mere translation of set passages.

## GREEK

1. The Pass Course in Greek shall consist of suitable selections from the following authors to be prescribed from time to time by the Board of Studies concerned:—

Plato, Herodotus, Homer, Euripides, Aristophanes, Sophocles, Demosthenes.

The course shall include Greek Syntax and Grammar, and Greek History as prescribed for the Intermediate in Arts.

2. The Honours Course shall include, in addition to the Pass Course, selections from the following authors, to be prescribed from time to time by the Board of Studies concerned:—

Thucydides, Æschylus,

and may also include further selections from the authors mentioned in Regulation 1.

The course shall include the Philology of the Greek Language as well as the History of Classical Greek Literature.

3. The subjects and marks shall be distributed in the same way as in the case of Armenian.

## LATIN

1. The Pass Course in Latin shall consist of suitable selections from the following authors to be prescribed from time to time by the Board of Studies concerned:—

Cicero, Livy, Lucan, Virgil, Horace.

The course shall include Latin Syntax and Grammar, and Roman History as prescribed for the Intermediate in Arts.

2. The Honours Course shall include, in addition to the Pass Course, selections from the following authors to be prescribed from time to time by the Board of Studies:—

Pliny, Tacitus, Terence, Lucretius, Catullus, and may also include further selections from the authors mentioned in Regulation 1.

The course shall include the Philology of the Latin Language as well as the History of Latin Literature to the end of the Augustan Period.

3. The subjects and marks shall be distributed in the different papers in the same way as in the case of Armenian.

## FRENCH AND GERMAN

1. The course in French or German for the Pass as well as for the Honours shall consist of such works in prose and

verse as may be prescribed from time to time by the Board of Studies concerned.

2. The Pass Course shall include in addition to the prescribed texts, Grammar and the Outlines of French or German History.

3. The Honours Course shall include, in addition to the subjects mentioned in Regulations 1 and 2 above, the elements of French or German Philology and the History of a selected period of French or German Literature.

4. The subjects and marks shall be distributed in the same way as in the case of Armenian.

### ITALIAN

1. The course in Italian for the Pass as well as for the Honours shall consist of such works in prose and verse as may be prescribed from time to time by the Board of Studies concerned.

2. The Pass Course shall include, in addition to the prescribed texts, Grammar and the outlines of Italian History.

3. The Honours Course shall include, in addition to the subjects mentioned in Regulations 1 and 2 above, the Elements of Italian Philology and the History of a selected period of Italian Literature.

4. The subjects and marks shall be distributed in the same way as in the case of Armenian.

### LINGUISTICS

This subject can be taken up only by candidates who take up one of the Languages specified in A (I) or Anthropology or History.

The Pass Course in Linguistics shall include the General Principles of Linguistic Science, Growth and Development of Languages, Phonetics, the Language-Families of the World, and the Languages of India.

The Honours Course in Linguistics shall include the topics prescribed for the Pass Course, to be studied in greater detail. In addition, it will include the Comparative and Historical Grammar of English, or of the language chosen from A (I), illustrated by selected texts. It shall further include a cognate language to be chosen out of an allied group according to a scheme to be recommended from time to time by the Board of Higher Studies in Comparative Philology. Easy texts in the cognate language shall be prescribed.

## HISTORY

1. The Pass Course in History shall be as follows:—

*Paper I.*—Indian History.

*Paper II.*—European History (1648-1815).

*Paper III.*—General History from 1815 to such date as may be fixed by the Board of Studies in History from time to time (with special reference to Europe).

2. The Honours Course shall comprise in addition to the above:—

*Paper IV.*—Special period of Indian History.

*Paper V.*—Special period of European History before 1648.

*Paper VI.*—

(a) Special period of Greek History.

(b) Special period of Roman History.

(c) Special period of the History of Islam outside India.

(d) Special period of the History of Hindu Colonial Expansion outside India.

The Honours Course is to be studied with some reference to the original sources.

In each of the Honours Papers IV and V two special subjects shall be prescribed, of which candidates will be at liberty to choose one. In the Honours Paper VI four special subjects, one special subject for each of the special periods mentioned in (a), (b), (c) and (d), will be prescribed and candidates will have the choice of one special subject out of four.

The list of special subjects shall be revised from time to time.

Candidates shall be expected to possess a knowledge of the geography of the countries whose history they study, and to understand the use of physical and historical maps.

Books on History shall be recommended from time to time by the Board of Studies concerned who shall also select the special periods.

## INDO-ISLAMIC AND WORLD HISTORY

The Pass Course in Indo-Islamic and World History shall be as follows:—

*Paper I.*—Ancient Indian History.

*Paper II.*—Outline of Islamic History.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of Ancient Indian History.

*Paper V.*—A Special Period of the History of Mediaeval India.

*Paper VI.*—General History of the East (Modern).

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

### ISLAMIC HISTORY AND CULTURE

The Pass Course in Islamic History and Culture shall be as follows:—

*Paper I.*—History of Islam in India.

*Paper II.*—Islamic Culture and Civilisation outside India.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of the History of Islam outside India.

*Paper V.*—A Special Period of the History of Islamic Culture and Civilisation outside India.

*Paper VI.*—Special Studies in Islamic and Hindu Cultures in India.

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

### ANCIENT INDIAN AND WORLD HISTORY

The Pass Course in Ancient Indian and World History shall be as follows:—

*Paper I.*—Ancient Indian History.

*Paper II.*—Social, Political and Economic Institutions of Ancient India.

*Paper III.*—A Selected Period of or Movement in World History.

The Honours Course shall comprise in addition to the above—

*Paper IV.*—A Special Period of Ancient Indian History with full treatment of Religious and Cultural activities of the age.

*Paper V.*—History of Bengal and Kamarupa till the thirteenth century A.D.

*Paper VI.*—One of the following Special subjects:—

(a) History of Hindu Colonial and Cultural Expansion.

(b) Contact between Hindu Culture and Islam.

(c) Pre-historic Culture of the Indus Valley and connected Civilisations of the Ancient World.

Candidates will be expected to possess a knowledge of the geography of the countries whose history they study and to understand the use of physical and historical maps.

The Honours Course is to be studied with some reference to the original sources.

The list of subjects may be revised from time to time by the Syndicate on the recommendation of the Board of Studies concerned. The Special Periods to be studied shall also be selected by the Syndicate on the recommendation of the Board of Studies concerned.

## POLITICAL ECONOMY AND POLITICAL PHILOSOPHY

1. The Pass Course in Political Economy and Political Philosophy shall be as follows:—

*Paper I.*—Political Economy.

*Paper II.*—Political Philosophy.

*Paper III.*—Application of the Principles of Political Economy to Indian topics.

2. The Honours Course, in addition to the above, shall be as follows:—

*Paper IV.*—Political Economy (a higher course).

*Paper V.*—Political Philosophy (a higher course), including a specially selected text or texts.

*Paper VI.*—Essay.

3. The following are the Syllabuses for the different subjects:—

### POLITICAL ECONOMY

Definition. Scope. Relation to Sociology. Politics. Statistics. Methods. Standpoints and Schools. Postulates. Wealth. Utility. Income.

A knowledge in outline of the fundamental propositions under each head of division named below. A fuller knowledge of the special points mentioned below under these heads:—

(a) *Production*.—Production on a large and on a small scale. Land. Labour. Capital. Laws of Return. Population. Organisation of Labour. Control of Business.

(b) *Consumption*.—Demand and Supply. Balance between the two.

(c) *Distribution*.—Rent. Wages. Profits. Systems of Rent and Land Tenure. Custom.

(d) *Exchange*.—Value. Price. Money. Bimetallism. Banks. Foreign Exchange. Credit. Trade, Home and Foreign. International Values.

(e) *Descriptive Economics*.—Companies and Partnership, Organisation of Industries, Trades Unions, Co-operation in the spheres of Production and Distribution, Co-operative Credit Societies. Banking systems. Money Market. Stock Exchange.

(f) *Economic functions of Government*.—Economic Freedom. Government regulation of, and Government participation in, the work of production, distribution and exchange. Taxation. Public Revenue and Expenditure. National Debt. Private Property. Socialism. Poor Laws. Free Trade. Protection. Reciprocity.

Economic Progress on the work of reproduction, distribution, and exchange.

### POLITICAL PHILOSOPHY

Definition. Scope. Methods.

The State. Leading Theories of its origin and nature. Law. Government.

The People of the State. The Nation. Nationality as a constituent element of the State. Political Society. Its Divisions. Privileged Classes. Citizenship. Classes without political rights.

Rights and Duties. History of Natural Law. Practical consequences of a belief in Natural Law.

The territory of the State. Its Political Divisions.

The Constitution of the State. Different forms of Constitutions. Monarchy, Oligarchy, Aristocracy, Democracy, City States. The outlines of the present constitutions of (a) France, (b) Germany, and (c) the United States. The present British constitution.

The Structure of the State. The Legislature. The Executive. The Judiciary. Power of Taxation. Control of the Public Purse. Test of Popular Liberty.

Growth of the State. Revolutions. Evolution. Functions of Legislation. The Individual and the State.

The End and Functions of the State. Sovereignty and Subjection. The nature and organisation of the Public Services.

#### APPLICATION OF THE PRINCIPLES OF POLITICAL ECONOMY TO INDIAN TOPICS

##### *The Geographical Factor.*

Physical features and conditions of the country and their bearings on Indian economic products. Facilities of Transport.

##### *The Special Factor.*

The Village system and Rural economy. Peasant proprietorship. Caste and its economic significance. Its influence on the organisation of Indian Industries. The Joint Family, and Hindu and Mahomedan Laws of Inheritance in regard to their economic bearings and consequences. Status and custom, and their influence on rents, wages and prices. Organisation of agriculture, handicraft and domestic industries in rural India. Caste Guilds. City Industries. Mahomedan Guilds and Industries. Indigenous organisation of Trade and Transport: of Banking and Agricultural credit.

##### *The Political Factor.*

Pax Britannica and its economic effects. Chief British Indian systems of Land tenure with their economic consequences. Foreign capital and organisation of labour, machinery, transport and credit, and the economic development of the country. Political relations of India to England, and their effect on the Balance of Trade.

The postulates of pure Economy, how modified in their application to Indian Consumption, Production, Distribution and Exchange.

*Consumption.*—The Indian standard of comfort as determining Indian consumption; the laws of consumption; statistics of Indian consumption; comparison with the United Kingdom.

##### *Production—*

- (a) The economics of a mainly agricultural country as opposed to those of a mainly manufacturing country.
- (b) Special conditions of land, labour and capital as affecting Indian production.
- (c) Comparative efficiency of labour and cost of production in the chief industries in India and other countries. National wealth of India. Average production per head. Average income, gross and net.
- (d) The development of manufacturing industries in India. Foreign capital and skill. Technical Education and its relation to castes and guilds.



*Distribution.*—Rent in India, as affected by (1) State Landlordism, (2) Permanent Zemindary settlements, (3) Pressure of population on the soil, (4) Land-tenure legislation and rent laws, (5) Custom.

Wages in different employments. Average rates. Purchasing power of wages.

*Profits.*—Profits of manufacture. The profits of the middleman as agricultural money-lender, and as commercial agent.

*Exchange.*—The Indian Balance of Trade. India's debt and the Home Charges. Currency Legislation and Foreign Exchange. The Gold Standard and its influence on prices. The Gold Reserve. The Gold and Silver Currency. Purchasing power of money. Commercial Legislation.

*Public Finance.*—Direct and indirect taxation. Chief heads of Revenue. Nature of land revenue in India. Incidence of taxation in India. Chief heads of Expenditure.

## MENTAL AND MORAL PHILOSOPHY

(1) The arrangement of papers shall be as follows:

### *Pass Course*

#### *Paper I.*

Psychology	...	... 100 marks.
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#### *Paper II.*

(a) Ethics	...	... 50 marks.
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(b) Indian Philosophy	...	... 50 marks.
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or

(b) Islamic Philosophy	...	... 50 marks.
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#### *Paper III.*

General Philosophy	...	... 100 marks.
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### *Honours Course*

#### *Paper I.*

Psychology	...	... 100 marks.
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#### *Paper II.*

Ethics	...	... 100 marks.
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#### *Paper III.*

General Philosophy	...	... 100 marks.
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#### *Paper IV.*

Philosophy of Religion	...	... 100 marks.
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#### *Paper V.*

History of Philosophy:

General	...	... 80 marks.
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Special Texts	...	... 20 marks.
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*Paper VI.*

(a) Indian Philosophy	...	...	60 marks.
or			
(a) Islamic Philosophy	...	...	60 marks.
(b) Essay	...	...	40 marks.

(2) The syllabus for the different subjects shall be as follows:—

*Paper I.*

## PSYCHOLOGY

*(Pass and Honours)*

*Definition*—Traditional and Modern. Relation of Psychology to Physiology, Sociology, Philosophy and Education.

*Methods*—Introspection: Observation and Experiment. The Genetic Method. The different schools of Psychology.

*Consciousness*—The Sub-conscious and the Unconscious. Mental states and processes.

*Sensation*—Stimulus and Response. Organic Sensations. Organs and sensations of Taste, Smell, Touch, Audition, Vision. Kinæsthetic sensations.

*Mental Measurement*—Weber's Law, Fechner's Law.

*Perception*—The Psychological Problem. Perceptions of Space, Time, Movement, Weight, Solidity and Distance. Illusions.

*Memory and Learning*—Association, Retention, Recall, Recognition.

*Imagination*—Definition and different forms. Dreams. Hallucinations.

*Feeling and Emotion*—Nature, Classification, Expressions and Theories. Moods and Sentiments.

*Thinking*—Relation to elementary forms of activity. Different types.

*Belief*—Its nature and grounds.

*Attention*—Its Nature, Range, Duration.

*Action*—Reflex and Conditioned Reflex. Instinctive and Habitual actions. Playful and Purposive activity. Voluntary actions.

*Intelligence*—Definition and Analysis. Intelligence and Conduct.

*Physiological Basis of Mental Life*—The Nerves and the Nervous system. The Neurones and the Synapses. The Nerve Centres. The Spinal Cord and the Brain. Sense organs and Motor organs. The Physiology of Emotion.

*Paper II.*

## A. ETHICS

*(Pass)*

Definition and province of Ethics.

Relation of Ethics to Psychology, Sociology, Politics and Theology.

Actions—Moral and non-moral. Analysis of desire. Intention. Motive. End. Volition. Sin and Error.

Nature and object of moral judgment.

Postulates of moral judgment. Reason, Personality, Self-determination.

Moral obligation—Nature and grounds. Moral Law. Sense of duty. Sanctions. Theories of reward and punishment.

The leading Ethical standards: Hedonism, Rationalism, Intuitionism and Perfectionism.

Relation of individual and society.

Duties and virtues—their classification. Conflict of duties. Growth of character. The moral ideal.

## B. INDIAN PHILOSOPHY

Outlines of Indian Philosophy with special reference to not more than two systems of Indian Philosophy to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

*Or*

## B. ISLAMIC PHILOSOPHY

Outlines of the History of Muslim Thought.

The detailed Syllabus in the subjects may be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

## ETHICS

*(Honours)*

Definition, province and end of Ethics.

Relation of Ethics to Psychology, Sociology, Politics, Metaphysics and Theology.

Actions: Moral and non-moral. Analysis of desire. Intention. Motive. End. Volition. Natural and moral evil. Sin and Error.

Elements of the moral consciousness—Intellectual, emotional, volitional. Good and evil. Right and wrong. The highest good. Moral sentiment.

Beginning and growth of moral consciousness. Early group life. Group morality. Socialising agencies. Custom. Personal morality.

Nature, method and object of moral judgment. Springs of action.

Postulates of moral judgment. Reason, Personality. Self-determination.

Conscience and prudence. The moral faculty.

Moral obligation—Nature, grounds and source of. The seat of authority in morals. Moral Law. Sense of duty. Merit and guilt. Sanctions. Theories of reward and punishment.

The leading Ethical standards and a critical estimate of them. Law—divine, ethical. Pleasure and happiness. Egoism. Altruism. The aesthetic sense. Immutable law and Eternal fitness. Perfectionism and self-realisation. Evolution, individual and social.

Relation of individual and society. The social organism. Moral institutions.

Duties and virtues—Nature and principles of their classification. Conflict of duties.

Growth of character. Moral progress in the race. The moral ideal.

*Paper III.*

#### GENERAL PHILOSOPHY

*(Pass and Honours)*

*Relation of Philosophy and Science.*—Their difference in method. Relation of Epistemology and Metaphysics.

Relation of Epistemology and Logic. General Theory of Judgment. General nature of Inference.

*Theories of the origin of knowledge.*—Empiricism, Intuitionism, Apriorism.

Space and time. Concept of substance. Theory of causality.

Types of Realism and Idealism.

Theories of Evolution. Matter, Life and Mind as stages of evolution. Value and reality. God and the World. The Absolute.

*Paper IV.*

#### PHILOSOPHY OF RELIGION

*(Honours)*

The problem and scope of the Philosophy of Religion. Relation to Science of Religion, Psychology of Religion, Metaphysics and Natural Theology.

The origin and development of Religion—Anthropological and Psychological theories and their criticism. Historical development.

The nature of Religion. Relation to Morality, Art, Science and Philosophy.

The religious consciousness. The different elements of cognition, emotion and volition.

*Grounds of Belief in God.*—The cosmological, teleological moral and ontological proofs.

The nature and attributes of the Divine Being. God and the Absolute. God and the world. God and the individual self. Freedom and immortality. Deism, Theism and Pantheism.

*The Objectivity of Religion.* The theory of knowledge and the metaphysics of Reality and their bearing on Religion. Anti-religious theories and their criticism: Materialism. Naturalism. Phenomenalism. Agnosticism. Positivism. Pessimism and the problem of evil.

*Paper V.*

## HISTORY OF PHILOSOPHY

(Honours)

A general knowledge of the systems of Bacon, Descartes, Spinoza, Locke, Berkeley, Hume, Leibnitz and Kant, and some specially selected texts.

*Paper VI.*

## (A) INDIAN PHILOSOPHY

(Honours)

Outlines of Indian Philosophy with special reference to not more than four systems to be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

Or

## (A) ISLAMIC PHILOSOPHY

(Honours)

Outlines of the main theological and philosophical schools in Islam.

The detailed Syllabus in the subject may be prescribed by the Syndicate from time to time on the recommendation of the Board of Studies concerned.

*Paper VI.*

## (B) ESSAY

(Honours)

On subjects drawn from Pass or Honours syllabuses or Texts.

The Syndicate shall prescribe text-books and also recommend books for reference on the recommendation of the Board of Studies concerned.

## GENERAL

1. A candidate must obtain in order to pass in the Pass Course—

In English	...	... 100 marks.
Vernacular or paper alternative to it	...	... 33 marks.
Any subject in Group A	...	... 100 marks.
Any subject in Group B in the Theoretical papers	60 marks.	
and in the Practical papers	...	... 40 marks.

2. A candidate must obtain in order to pass in the Honours Course—

In English	...	... 180 marks.
Any subject in Group A	...	... 180 marks.
Any subject in Group B in the Theoretical papers	...	... 108 marks.
and in the Practical papers	...	... 72 marks.

3. A candidate must obtain, in order to qualify for Honours—

In English	...	... 240 marks.
Any subject in Group A	...	... 240 marks.
Any subject in Group B in the Theoretical papers	...	... 160 marks.
and in the Practical papers	...	... 80 marks.

4. If a candidate takes up the Pass Course in four subjects, he must, in order to pass the B.A. Examination, pass in each subject, and obtain 360 marks in the aggregate. If he passes and obtains 500 marks in the aggregate, he shall be declared to have passed with Distinction.

5. If a candidate takes up the Pass Course in three subjects, and the Honours Course in one subject, he must, in order to pass the B.A. Examination, pass in each subject, and obtain 468 marks in the aggregate. If he passes and also qualifies for Honours in his Honours subject, he shall be declared to have obtained Second Class Honours in that subject. If he passes, qualifies for Honours in his Honours subject and obtains 360 marks in that subject, he shall be declared to have obtained First Class Honours in such subject.

6. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the Examination, shall be allowed to pass. If any such candidate has taken up the Pass Course in three subjects, he shall not be declared to have passed with

**Distinction.** But if the candidate has taken up the Pass Course in three subjects and the Honours Course in one subject, and has qualified for Honours in such subject, he shall be allowed to retain his Honours and his place in the Honours list.

7. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXIII

### MASTER OF ARTS

1. An Examination for the degree of Master of Arts shall be held annually in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

Any candidate who has passed the B.A. or the B.Com. Examination not less than two academical years previously may be examined for the degree of M.A. in any subject mentioned in paragraph 5, provided he has prosecuted a regular course of study in that subject for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University, subject to the following condition:—

No candidate shall be allowed to prosecute such course of study in the subject taken up by him for the M.A. Examination in an affiliated College or affiliated Colleges, or in the University Post-Graduate classes, unless he has passed the B.A. or B.Com. Examination in that subject or in an allied subject. The Executive Committee of the Council of Post-Graduate Teaching in Arts shall have power, in very special cases, to exempt a candidate from fulfilling this condition only in respect of subjects mentioned in I—XIV-A.

*N.B.*—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

Any candidate who has passed the B.A. or the B.Com. Examination not less than three academical years previously may be admitted as a private student to the M.A. Examination in any of the subjects included in I—XV-A, subject to the provisions of Section 19 of the Indian Universities Act.

In the case of any of the subjects included in I—XV-A in which there is for the time being no provision for a regular course of study in the Post-Graduate classes of the University, a candidate who has passed the B.A. or the B.Com. Examination not less than two academical years previously may be admitted to the M.A. Examination in that subject as a private student, subject to the provisions of Section 19 of the Indian Universities Act.



2. Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate, and a fee of Rs. 80 to the Registrar not less than three months\* before the Examination. If a student desires to appear in the M.A. Examination in subjects III, VI, VII, XI, or XXII, he shall give the Registrar one year's notice of the fact.

3. Any Master of Arts may, on payment of a fee of Rs. 80, be admitted to the M.A. Examination in any subject or a group comprised in a subject other than that in which he was previously examined, provided that if he takes any of the subjects XVI to XXV, he has passed the B.A. Examination in such subject or in an allied subject and has prosecuted a regular course of study in that subject for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University. He shall, if his attainments come up to the standard prescribed for the degree of M.A., be granted a certificate to that effect stating the subject and class in which he has passed.

*N.B.*—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

4. A candidate who fails to pass or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent M.A. Examinations in that subject as a private student on payment of a like fee of Eighty Rupees on each occasion, subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

4A. If a student, after completion of a regular course of study for the examination does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required under the Regulations, a certificate from the Head of the Institution at which he studied or from a member of the Senate testifying to his good character during the intervening period, and provided further

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\* Candidates who take up Pure Mathematics and Applied Mathematics shall send in their applications and fees to the Registrar six months before the commencement of the Examination.

that in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

Such a student may appear at any one or more subsequent M.A. Examinations in that subject as a private candidate on payment of the prescribed fee, subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

5. A candidate may be examined in any of the following subjects:—

- (I) English.
- (II) Sanskrit.
- (III) Pali.
- (IV) Arabic.
- (V) Persian.
- (VI) Hebrew.
- (VII) Syriac.
- (VIII) Greek.
- (IX) Latin.
- (IX-A) French.
- (IX-B) German.
- (X) Modern Indian Language.
- (XI) Comparative Philology.
- (XII) Mental and Moral Philosophy.
- (XIII) History.
- (XIII-A) Ancient Indian History and Culture.
- (XIII-B) Islamic History and Culture.
- (XIV) Political Economy and Political  
Philosophy.
- (XIV-A) Commerce.
- (XV) Pure Mathematics.

- (XV-A) Applied Mathematics.
- (XVI) Physics.
- (XVI-A) Applied Physics.
- (XVII) Chemistry.
- (XVII-A) Applied Chemistry.
- (XVIII) Physiology.
- (XIX) Botany.
- (XX) Geology.
- (XXI) Zoology and Comparative Anatomy.
- (XXII) Psychology.
- (XXIII) Anthropology.
- (XXIV) Statistics.
- (XXV) Geography.

6. In each of the subjects I to XIV-A there shall be eight papers of four hours each, each carrying 100 marks.

In each of the subjects XV to XXV the papers and the marks shall be distributed as laid down in the Regulations for the M.Sc. Examination.

7. Candidates who have taken the Degree of B.A. with Honours in any of the subjects XV-XXV may be allowed to substitute a piece of research work for part of the M.A. Examination in that subject under the conditions laid down in the Regulation<sup>s</sup> for the M.Sc. Degree.

In all these subjects the Syllabuses shall be the same as those prescribed for the M.Sc. Examination.

8. The limits of the subjects shall be as follows:—

### ENGLISH

1. The M.A. course in English shall be divided into two groups.

2. The first four papers of each group shall be identical, and shall cover the following subjects:—

- Paper I*—(a) General History of English Literature 70 marks  
 (b) History of English Language (for Gr. A) 30 marks  
 or  
 (b) Principles of Criticism (for Gr. B) 30 marks

The subjects shall be studied according to syllabuses prescribed.

- |   |     |     |           |
|---|-----|-----|-----------|
| <i>Paper II</i> .—Drama Texts                       | ... | ... | 80 marks. |
| Unseens   | ... | ... | 20 marks. |
| <i>Paper III</i> .—Poetry Texts (including Chaucer) | ... | ... | 80 marks. |
| Unseens   | ... | ... | 20 marks. |
| <i>Paper IV</i> .—Prose Texts                       | ... | ... | 80 marks. |
| Unseens   | ... | ... | 20 marks. |

3. The course for the above papers shall include standard works in Prose, Poetry and the Drama, which shall be specified from time to time, and shall range from Chaucer down to the end of the 19th century, due regard being had to the relative importance of the different periods.

4. The remaining papers shall be taken from one of the following groups, but not from both:—

#### GROUP A

Papers V, VI, VII shall be chosen out of the following five of which at least two shall be from the first three:—

- (a) A selected period of Drama ... 100 marks.
- (b) A selected period of Poetry ... 100 marks.
- (c) A selected period of Prose ... 100 marks.
- (d) Foreign Classics in Translation to be studied in relation to English literature ... 100 marks.
- (e) History and Principles of Criticism (including a general study of literary types) ... 100 marks.

*Paper VIII.*—An Essay or Essays on subjects connected with the course ... 100 marks.

The special periods and courses in Papers V, VI and VII shall be specified from time to time; no period shall be selected before Chaucer and not more than one shall be pre-Elizabethan.

#### GROUP B

Papers V, VI, VII shall be chosen out of the following five of which at least two shall be from the first three:—

- (a) Old English Texts (including Grammar) ... 80 marks.  
Unseens ... 20 marks.
- (b) Middle English Texts (including Grammar) ... 80 marks.  
Unseens ... 20 marks.
- (c) History of English Language (including elements of Teutonic Philology) ... 100 marks.
- (d) Early Germanic and Early French Classics in Translation to be studied in relation to Old and Middle English Literature ... 100 marks.
- (e) Gothic or Old Verse or Old High German with prescribed texts of a simple nature ... 100 marks.

*Paper VIII.*—An Essay or Essays on subjects connected with the course ... 100 marks.

5. Unseen passages in Papers II, III and IV shall be of the same standard as the texts prescribed and intelligent critical appreciation of the passages set shall be insisted upon.

6. Questions on the text shall include—

- (a) Questions on the subject-matter, and
- (b) Questions on the language of the text.

A candidate who has taken his B.A. degree with Honours in English, may, subject to the conditions specified below, offer a thesis connected with some department of the subject in lieu of examination in two Papers. If the candidate has taken up Group A, the thesis will be allowed to be substituted for either Paper V, VI or VII, and Paper VIII. If the candidate has taken up Group B, the thesis will be allowed to be substituted for either Paper II, III or IV, and Paper VIII.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows:—

(a) He must have completed one year's study of the M.A. course in English under University Lecturers or in a College affiliated in English up to the M.A. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in English an application for permission to offer a thesis in lieu of part of the examination.

(c) The application shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in English, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, in their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

7. In one of the first three papers (a), (b), (c) in Group A and of the first two (a), (b) in Group B (as detailed in Sub-section 4 above) the method of teaching and the questions set shall be such that candidates may concern themselves either with literature or with life and thought.

## SANSKRIT

The course shall include the following:—

**General Papers***Paper I.*

- (a) Select Hymns from the R̥gveda including the first Adhyāya of the Aṣṭaka, with Sāyaṇa's Commentary thereon and a general knowledge of Sāyaṇa's Introduction to his Commentary on the R̥gveda 60 marks.
- (b) Other Select Vedic Texts with select Commentaries ... 40 marks.

*Paper II.*

- (a) Select topics of the Siddhāntakaumudī ... 75 marks.
- (b) Select portions of the Mahābhāṣya ... 25 marks.

*Paper III.*

- (a) Sanskrit Linguistics including modern interpretation of Sanskrit Grammar ... 50 marks.
- (b) An Elementary Sanskrit treatise on Logic with select portions of the Sādhakhaṇḍa 50 marks.

*Paper IV.*

- (a) History of Sanskrit Literature ... 60 marks.  
(The subject should be studied according to the syllabus to be prescribed from time to time.)
- (b) Alāṅkāra 40 marks.

**Special Papers**

## GROUP A—(Classical Literature)

*Paper V.*

- Select Alāṅkāra texts including Dramaturgy with a general knowledge of the development of Alāṅkāra Literature ... 100 marks.

*Paper VI.*

- (a) Select Poetry Texts (Ancient and Mediæval) 85 marks.
- (b) Prosody ... 15 marks.

*Paper VII.*

- (a) Select Drama Texts (Ancient and Mediæval) 80 marks.
- (b) Elements of Prakrit Grammar ... 20 marks.

**Paper VIII.**

- (a) Select Prose Texts including Campūs (Ancient and Mediæval) ... 70 marks.  
 (b) Translation from simple classical Sanskrit unseens into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

**GROUP B—(Vedas)****Paper V.**

- (a) Select Mantra Texts with select epexegetical works including modern interpretation of the Veda ... 70 marks.  
 (b) A Critical Survey of Vedic literature ... 30 marks.

**Paper VI.**

- (a) Select Texts from the Brāhmanas, the Āraṇyakas and the Upaniṣads with select epexegetical works 75 marks.  
 (b) Relation of Avesta with the Veda 25 marks.

**Paper VII.**

- (a) Yāska's Nirukta and Vedic metres as in Piṅgala's Chandaḥ Sūtras ... 75 marks.  
 (b) A general knowledge on one simple Yajña 25 marks.

**Paper VIII.**

- (a) Other select Vedāṅga Texts ... 70 marks.  
 (b) Translation from simple Vedic passages into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

**GROUP C—(Mīmāṃsā)****Paper V.**

- (a) Jaimini's Mīmāṃsāsūtra (three Adhyāyas including the first and the second) with Sabara's Bhāṣya on the same. Select portions of the Bṛhatī of Prabhākara 70 marks.  
 (b) A Critical Survey of Mīmāṃsā Literature 30 marks.

**Paper VI.**

- Slokavārttika up to Sūnyavāda; Select portions from Apohavāda and Sarvajñatva-khaṇḍana; Sāstradīpikā (1st Adhyāya); Smṛtipāda of Tantravārttika 100 marks.

**Paper VII.**

Jaiminiyanyāyamālāvistara; Vidhivāda of Bhāṭ  
ṭarahasya (Khaṇḍadeva); Nyāyaprakāśa 100 marks..

**Paper VIII.**

- (a) Select portions of the Taittiriya Samhitā  
(Darśapūrṇamāsa prakaraṇa); Select  
portions of Bodhāyana's or Āpastamba's  
Śrautasūtra with a detailed knowledge  
of the Darśapūrṇamāsa Yajña; Tantra-  
rahasya of Rāmānujācārya ... 70 marks..
- (b) Translation from Sanskrit unseen into  
English or from English into Sanskrit  
or Essay in Sanskrit ... 30 marks.

## GROUP D—(Vedānta)

**Paper V.**

- (a) Select portions of the Vedāntasūtras with  
with Śaṅkara-bhāṣya ... 70 marks..
- (b) A Critical Survey of Vedānta Literature ... 30 marks.

**Paper VI.**

- (a) Select portions of the Vedāntasūtras with  
Śaṅkara's Bhāṣya and select portions of  
the Bhāmatī ... 75 marks.
- (b) Select texts of Vedānta Dialectics ... 25 marks..

**Paper VII.**

- Select portions of Pañcapādikā with Vivaraṇa  
and select portions of Siddhāntaleśa 100 marks..

**Paper VIII.**

- (a) Select portions of the Śribhāṣya (on the first  
Sūtra only) ... 40 marks.
- (b) Select systems of Sarvadarśanasamgraha 30 marks..
- (c) Translation from Sanskrit Unseens into Eng-  
lish or from English into Sanskrit or  
Essay in Sanskrit ... 30 marks..

## GROUP E—(Sāṅkhya-Yoga)

**Paper V.**

- (a) Sāṅkhyasūtras with Pravacanabhāṣya ... 50 marks..
- (b) Brahmasūtras (2nd Adhyāya—1st and 2nd  
pādas only) with Śaṅkara's Commentary 50 marks..



*Paper VI.*

- (a) Sāṅkhyakārikās of Iśvarakṛṣṇa with Commentaries and Sāṅkhyasāra ... 70 marks.  
 (b) A Critical Survey of Sāṅkhya and Yoga Literature ... 30 marks.

*Paper VII.*

- Yogasūtras with Vyāsa-bhāṣya, Tattva-vaiśāradi and Vārtika ... 100 marks.

*Paper VIII.*

- (a) Select systems of Sarvadarśanasamgraha 70 marks.  
 (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

## GROUP F—(Nyāya-Vaiśeṣika)

*Paper V.*

- (a) Nyāyasūtras of Gautama with Bhāṣya of Vātsāyana ... 70 marks.  
 (b) Critical Survey of Nyāya-Vaiśeṣika Philosophy 30 marks

*Paper VI.*

- (a) Select portions of Nyāyamañjarī of Jayantabhaṭṭa ... 70 marks.  
 (b) Select systems of Sarvadarśanasamgraha 30 marks.

*Paper VII.*

- Prāśastāpāda's Padārthadharmaśamgraha with Nyāyakandali and Vaiśeṣikasūtra with Jayanārāyaṇa's Vṛtti ... 100 marks.

*Paper VIII.*

- (a) Select portions of Nyāyakusumāñjali and Siddhāntalakṣaṇa with the Commentary Māthurī ... 70 marks.  
 (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

## GROUP G (General Philosophy)

*Paper V.*

- (a) Sāṅkhyakārikā with Sāṅkhyatattvakau-mudī; Yogasūtras of Patañjali with Vyāsabhāṣya ... 70 marks.

- (b) A Critical Survey of general Sanskrit Philo-  
sophy ... 30 marks.

*Paper VI.*

- (a) Select portions of Nyāyasūtras of Gautama  
with Vātsāyana-bhāṣya ... 50 marks.  
(b) Selections from Praśastapāda's Padārtha-  
dharma-saṃgraha ... 50 marks.

*Paper VII.*

- (a) Select portions of Vedāntaparibhāṣa and  
Brahmasūtra with Saṅkara's Commentary ... 50 marks.  
(b) Mīmāṃsānyāyaprakāśa of Āpadeva ... 50 marks.

*Paper VIII.*

- (a) Select texts of Buddhist and Jaina Philo-  
sophy ... 70 marks.  
(b) Translation from Sanskrit Unseen into  
English or from English into Sanskrit  
or Essay in Sanskrit ... 30 marks.

GROUP H—(Prākṛit)

*Paper V.*

- (a) Oldest Prākṛit Texts—Select Aśoka and  
other early Inscriptions ... 50 marks.  
(b) Pāli Texts ... 25 marks.  
(c) Buddhist Sanskrit Texts ... 25 marks.

*Paper VI.*

- (a) Prākṛit Texts—  
(i) Jaina Canonical Texts  
(ii) Prākṛit Texts in Sanskrit Dramas } ... 70 marks.  
(iii) Prākṛit Drama  
(b) Critical Survey of Prākṛit Literature ... 30 marks.

*Paper VII.*

- (a) Prākṛit Prose and Poetry and Apabhraṃśa  
Texts ... 70 marks.  
(b) Prākṛit Philology ... 30 marks.

*Paper VIII.*

- (a) Prākṛit Grammar and Prosody ... 50 marks.  
(b) Pāli Grammar ... 20 marks.  
(c) Translation from Sanskrit or Prākṛit Un-  
seen into English or from English into  
Sanskrit (or Prākṛit) or Essay in Sans-  
krit ... 30 marks.

GROUP I—(*Epigraphy and History*)*Paper V.*

- (a) Select Prākṛit Inscriptions with special reference to the Maurya period ... 70 marks.
- (b) Early Indian Alphabet ... 30 marks.

*Paper VI.*

- (a) Select Prākṛit Inscriptions with special reference to Eastern India ... 70 marks.
- (b) Development of Modern Indian Alphabets with special study of the Bengali and Nagri Scripts ... 30 marks.

*N.B.*—All Inscriptions should be studied critically with reference to their language, matter and historical bearing.

*Paper VII.*

- Select Texts from Sanskrit Literature on History and Polity ... 100 marks.

*Paper VIII.*

- (a) Ancient Geography of India with special reference to original texts ... 40 marks.
- (b) Select Texts from the Literature on Ancient Art and Iconography ... 30 marks.
- (c) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

GROUP J—(*Vaiṣṇavism*)*Paper V.*

- |   |     |           |
|---|-----|-----------|
| Select Vedic Hymns on Viṣṇu and select texts from Upaniṣads and Epics | }   | 70 marks. |
| Select portions of the Siddhitraya of Yamunā-cārya                    |     |           |
| Select portions of the Śrībhāṣya                                      |     |           |
| Select portions of the Nyāyapariśuddhi                                |     |           |
| Select portions of the Tattvamuktākālāpa                              |     |           |
| A critical survey of Vaiṣṇava Literature                              | ... | 30 marks. |

*Paper VI.*

Mādhvasiddhāntasāra	} 100 marks.
Select portions of Tātparyaprakāśa of Vyāsa-tīrtha	
Pramāṇapaddhati	
Select portions of Nyāyāmṛta	
Bhaktirasāyana of Madhusūdana Sarasvatī	}

*Paper VII.*

Laghu-bhāgavatāmṛta	} 100 marks.
Select Sandarbhas of Saṭsandarbhā with Sarvasamvādinī	
Select portions of Govinda-bhāṣya and Prameyaratnamālā	
Select portions of Ujjvalanīlamanī	
Select portions of Bhāgavata with Toṣaṇī	
Select portions of Viṣṇupurāṇa	
Select portions of Chaitanyacharitāmṛta of Kṛṣṇadāsa Kavirāja	

*Paper VIII.*

- (a) Select portions of Vallabha's Bhāṣya on Brahmasūtras; Select portions of Nimbārka's Bhāṣya with Śrīnivāsa's commentary; Select portions of Ahirbudhnyasamhitā and Jayākhyasamhitā; Brahmasamhitā as in Bhaktivinoda's edition; Vidvanmaṇḍana; Vedāntaratnamāñjūṣa ... 70 marks.
- (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit ... 80 marks.

## GROUP K—(Smṛti)

*Paper V.*

- (a) Pāraskara Grhyasūtra or Gobhila Grhyasūtra; Bodhāyana's Dharmasūtra; Āpastamba's Dharmasūtra or Gautama's Dharmasūtra; Select portions of Parāśarasamriti with Mādhava ... 70 marks.
- (b) A critical survey of Smṛti Literature ... 80 marks.

*Paper VI.*

- Select portions of Yājñavalkya with Mitākṣarā; Jīmūtavāhana's Dāyabhāga with Select portions of Śrīkṛṣṇa Tarkālaṅkāra's Commentary; Select portions of Manu with Medhātithi's Bhāṣya; Select portions from Hemādri ... 100 marks.

*Paper VII.*

- Select portions of Malamāsatattva, Udvāha-  
tattva and Nirṇayasindhu; Select por-  
tions of Śrāddhaviveka, Ekādaśītattva  
and Dattakamimāṃsā ... 100 marks.

*Paper VIII.*

- (a) Select portions of Jaiminīyanyāyamālāvis-  
tara; Nyāyaprakāśa ... 70 marks.  
(b) Translation from Sanskrit Unseens into  
English or from English into Sanskrit  
or Essay in Sanskrit ... 30 marks.

## GROUP I—(Jainism)

*Paper V.*

- (a) Select portions from three of the Canonical  
Aṅgas with Commentary and Prākṛit  
Grammar with special reference to  
Ardhamāgadhī ... 70 marks.  
(b) A critical survey of Jaina Literature ... 30 marks.

*Paper VI.*

- Tattvārthādhigamasūtra with Vṛtti; Select  
portions of Tattvārthaśloka-vārttika;  
Dravyasaṃgraha of Nemicaṇḍra; Jai-  
natarkavārttika with the commentary  
of Sāntīyācārya; Pravacanasāra of  
Kundakundācārya ... 100 marks.

*Paper VII.*

- Select portions of Prāmāṇyanūyatattvālokū-  
laṅkāra of Devasūri; Select portions of  
Pramāṇamimāṃsā and Syādvādamāñ-  
jari of Malliṣeṇa; Select portions of  
Aṣṭasāhasrī of Vidyānandi ... 100 marks.

*Paper VIII.*

- (a) Parīkṣāmukhasūtravṛtti of Anantavīrya; Se-  
lect portions of Prameyakamalamār-  
taṇḍa; Saḍdarśanasamuccaya with  
Gūṇaratna's Tikā ... 70 marks.  
(b) Translation from Sanskrit Unseens into  
English or from English into Sanskrit  
or Essay in Sanskrit ... 30 marks.

GROUP M—(*Saivism and Tāntricism*)*Paper V.*

- (a) Rudrādhyaṃya, Devisūkta and Durgāsaptasatī (in Mārkaṇḍeya-purāṇa); Select portions of Brahmasūtra with Śrīkaṇṭhabhāṣya and Sivārkaṇḍīpikā; Virasaivacintāmaṇi; Select portions of Śrīkarabhāṣya ... 70 marks.
- (b) A critical survey of the Saiva and Tantra Literature ... 30 marks.

*Paper VI.*

- Spandapradīpikā; Select portions of Tantrāloka; Pratyabhijñā-vimarśinī; Parātrīpśikā; Śivasūtravimarśinī; Mahārthamañjarī with Parimala ... 100 marks.

*Paper VII.*

- Sādhana-mālā; Advaya-vajrasaṃgraha; Prajñopāyavinīścayasiddhi; Jñānasiddhi; Pañcākrama; Select portions of Saktisāṅgama Tantra; Select portions of Āryamañjuśrīmūlakalpa; Viṃśikā and Trīpśikā with Sthiramati's Commentary 100 marks.

*Paper VIII.*

- (a) Satcakranirūpaṇa with Commentary; Select portions of Sāradātīlaka; Select systems of Sarvadarśana-saṃgraha; Select portions of Tantrasāra; Vedāntasāra and Sāṅkhyatattvakaumudī; Varivasyā-Bhāṣya; Nityaṣoḍaśikāṇava with Bhāskara-rāya's Commentary ... 70 marks.
- (b) Translation from Sanskrit Unseen into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

GROUP N—(*Mixed Group*)*Paper V.*

- (a) Selections from Kāvya texts; Select Drama texts ... 70 marks.
- (b) A Critical survey of Sanskrit literature ... 30 marks.

*Paper VI.*

- (a) Mammata's Kāvya-prakāśa ... 50 marks.  
 (b) Vararuci's Prakṛta-prakāśa; Karpūramañ-jarī; Select Inscriptions of Aśoka ... 50 marks.

*Paper VII.*

- (a) Brahmasūtra-Catuhṣūtrī with Saṅkara-bhāṣya; Brahmasūtra—1st and 2nd pādas of the 2nd Adhyāya; Select portions of Brhadāranyaka or Chāndogya Upaniṣad with Saṅkarabhāṣya 50 marks.  
 (b) Select portions of Nyāyasūtra with Viśva-nāthavṛtti; Sāṅkhyatattvakaumudī 50 marks.

*Paper VIII.*

- (a) Vijñaptimātratāsiddhi; Tattvārthadhigama-sūtra with Vṛtti. Tarkapāda of Sāstradīpikā ... 70 marks.  
 (b) Translation from Sanskrit Unseens into English or from English into Sanskrit or Essay in Sanskrit ... 30 marks.

Questions on prescribed texts (except on Grammar and Poetics) in the compulsory papers as also in every Group may include—

(i) Questions on the subject-matter and on the language of the set books.

(ii) Passages for discussion in simple Sanskrit, taken from standard Sanskrit Commentaries on the texts.

In Groups C, D, E, F and G, the questions on the prescribed texts shall also include alternative questions on philosophical topics for discussion in English (or in simple Sanskrit at the option of the candidate); in answering such questions, candidates will be expected to be able to state the views of the school taken up and controvert the views of the other schools.

The first paper shall include questions on the History of Vedic Literature, and the History of Philosophy and Religion during the Vedic period.

The second paper, in Group A the seventh paper and in Group H the eighth paper, shall include questions on the practical application of the rules of Grammar.

The fifth paper in Group A shall include questions framed with a view to test the ability of candidates to apply the rules of rhetoric to passages from the prescribed texts.

Passages set for translation from English into Sanskrit shall be translated into Classical (and not Vedic) Sanskrit.

The Syndicate shall, upon the recommendation of the Board of Studies concerned, have power to add to or modify the list of specified books from time to time and to select the texts in accordance with the syllabus, and may also recommend books or specify editions to indicate more fully the extent and standard of knowledge required in any paper.

## PALI

1. The M.A. course in Pali shall comprise the following five groups:—

- A. Literature.
- B. Philosophy and Religion.
- C. Epigraphy and History.
- D. Mahayana Literature and Philosophy.
- E. Art and Iconography.

2. There shall be eight papers, each carrying 100 marks. The papers shall be distributed as follows:—

(i) *Compulsory*:—

*Paper I.*—Select portions of Buddhist Sutras (Pali and Sanskrit) with or without commentaries.

*Paper II.*—Select portions of the Vinaya and ecclesiastical chronicles.

*Paper III.*—Select portions of the Buddhist Philosophical works (Pali and Sanskrit).

*Paper IV.*—Language and Literature.

*Paper V.*—History and Geography (with special reference to the original texts).

(ii) *Special*:—

Besides the five Compulsory Papers, candidates will have to select *one* of the following Groups:—

### GROUP A—(Literature)

*Paper VI.*—Special Jatakas and Avadanas and the select texts of Folk Literature.

*Paper VII.*—Select poetical pieces and extra-canonical texts (Prose and Poetry).

*Paper VIII.*—Comparative study of allied Indian literature and Essay.

### GROUP B—(Philosophy and Religion)

*Paper VI.*—Special Philosophical texts from Pali Literature.



*Paper VII.*—Special Philosophical texts from Buddhist Sanskrit Literature and other Sanskrit texts dealing with Buddhist Philosophy.

*Paper VIII.*—Comparative studies in Indian Philosophy and Essay.

GROUP C—(*Epigraphy and History*)

*Paper VI.*—Special Buddhist Historical texts, Archaeological reports and Records of Buddhist pilgrims.

*Paper VII.*—Select Prakrit Inscriptions.

*Paper VIII.*—Select Sanskrit Inscriptions and Essay.

GROUP D—(*Mahayana Literature and Philosophy*)

*Paper VI.*—Select Sanskrit Sutras and Poetical works.

*Paper VII.*—Special Philosophical and Tantra Texts.

*Paper VIII.*—Buddhism outside India and Essay.

GROUP E—(*Art and Iconography*)

*Paper VI.*—Select Buddhist and other Indian texts dealing with Architecture, Sculpture and Painting.

*Paper VII.*—Select Buddhist Monuments, Reliefs, Images and Frescoes.

*Paper VIII.*—Buddhist Art in its origin and development in and outside India and Essay.

3. Students shall be expected to be able to read Buddhist texts in Sinhalese, Siamese and Burmese characters.

ARABIC

1. The M.A. course in Arabic shall be divided into six groups.

2. The first four papers of all the groups shall be identical and shall cover the following subjects:—

*Paper I.*—History of Islam in Arabia and Persia and in Mediterranean countries 100 marks.

*Paper II.*—(i) History of the Arabic Language 30 marks.

The course in the History of the Arabic Language includes the following topics:

Classification of Languages—the General Characteristics of the Semitic Family of Speech—The Grouping of the Semi-

tic Languages—Elements of the History of the Sounds and Inflexions of Arabic in the Pre-Islamic and Classical Periods.

- (ii) History of Arabic Literature ... 70 marks.
- Paper III.*—(i) Arabic Grammar ... 30 marks.
- (ii) Rhetoric and Prosody ... 30 marks.
- (iii) Translation of Unseen passages from Arabic into English and *vice versa* ... 40 marks.
- Paper IV.*—(i) Modern Arabic.
- (a) Prose, and } 50 marks.
- (b) Poetry }
- (ii) Essay on a subject connected with the compulsory papers 50 marks.

3. The remaining papers shall be taken from one of the following groups:—

#### GROUP A—(*Literature*)

- Paper V.*—Text—Pre-Islamic Poetry 100 marks.
- Paper VI.*—Text—Post-Islamic Poetry 100 marks.
- Paper VII.*—Text—Literary Criticism 100 marks.
- Paper VIII.*—Text—Prose 100 marks.
- (i) Rhymed
- (ii) Unrhymed.

#### GROUP B—(*History*)

- Paper V.*—Philosophy of History 100 marks.
- Paper VI.*—Early Caliphate, Umayyads and Abbasides ... 100 marks.
- Paper VII.*—Muslims in Spain ... 100 marks.
- Paper VIII.*—A special period in the history of Islam to be prescribed every year by the Board ... 100 marks.

#### GROUP C—(*The Quran and the Tafsir*)

- Paper V.*—Text from the Quran ... 100 marks.
- (i) Sura Maida
- (ii) Sura Yusuf
- (iii) Sura Najm.

<i>Paper VI.</i> —Text—Tafsir al-Baydawi-Sura Ali Imran	... 100 marks.
<i>Paper VII.</i> —Quranic Sciences	... 100 marks.
<i>Paper VIII.</i> —History of the Interpretation of the Quran	... 100 marks.

GROUP D—(*Hadith*)

<i>Paper V.</i> —Text	... 100 marks.
<i>Paper VI.</i> —Text	... 100 marks.
<i>Paper VII.</i> —Usul-i-Hadith including the Maudu'at	... 100 marks.
<i>Paper VIII.</i> —The History of the Development of the Science of Hadith	... 100 marks.

GROUP E—(*Ilmu'l Kalam and Philosophy*)

<i>Paper V.</i> —Al-Falsafatul-Ishraqiya	... 100 marks.
<i>Paper VI.</i> —Al-Falsafatul-Mashshya	... 100 marks.
<i>Paper VII.</i> —Ilmu'l-Kalam	... 100 marks.
<i>Paper VIII.</i> —History of Muslim Philosophy and Ilmu'l-Kalam	... 100 marks.

GROUP F—(*Philology and Grammar*)

Only such students will be allowed to take up this Group as have passed the B.A. Examination with Honours in Arabic or any other examination equivalent to it or the M.A. Examination in any other Group in Arabic.

<i>Paper V.</i> —(i) Arabic Grammar	... 50 marks.
(ii) Linguistic theories of the Arab Grammarians	... 50 marks.
<i>Paper VI.</i> —(i) General Principles of Linguistic Development including Phone- tics	} 100 marks.
(ii) Elements of Arabic Palaeo- graphy	
<i>Paper VII.</i> —(a) Hebrew	... 50 marks.
(b) Syriac	... 50 marks.
<i>Paper VIII.</i> —Comparative Philology of the Semitic languages	... 100 marks.

4. A candidate who has passed the B.A. Examination with Honours in Arabic or the Madrasa Senior Certificate Examination or any other examination equivalent to it may, subject to the conditions specified below, offer a thesis on a subject con-

nected with the Special Group chosen for study, instead of Papers III and IV. The thesis may be written in Arabic or in English.

5. The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows:—

(a) He must have completed one year's study of the M.A. course in Arabic under University Lecturers or in a College affiliated in Arabic up to the M.A. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Arabic and Persian, an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Arabic and Persian, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts, at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, at their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

6. The limits of the subjects shall be defined and books shall be prescribed and recommended from time to time by the Board of Higher Studies concerned.

## PERSIAN

1. The M.A. course in Persian shall be divided into five groups.

2. The first four papers of all the groups shall be identical and shall cover the following subjects:—

*Paper I.*—(i) General History of Pre-Islamic  
and Post-Islamic Persia ... 70 marks.

(ii) General History of Islamic India 30 marks.

*Paper II.*—History of Persian Literature ... 100 marks.

*Paper III.*—(i) Philology ... 30 marks.

The course in Persian Philology includes the following topics:—

Classification of Languages—the Indo-European Family of Languages—the Aryan or Indo-Iranian branch—the Classification of the Iranian Speeches—History of Iranian in its sounds and inflexions in the Old Iranian, Middle Iranian and New Iranian Periods (through the Persian language).

(ii) Rhetoric and Prosody ... 30 marks.

(iii) Unseen ... 40 marks.

*Paper IV.*—(i) Modern Persian :

(a) Poetry \ ... 50 marks.

(b) Prose |

(ii) Essay on a subject connected with compulsory papers ... 50 marks.

3. The remaining papers shall be taken from one of the following groups:—

#### GROUP A—(*Literature*)

*Paper V.*—Text—Poetry (i) Ghazal ... 70 marks.

(ii) Rubai ... 30 marks.

*Paper VI.*—Text—Poetry (i) Qasida ... 50 marks.

(ii) Mathnawi ... 50 marks.

*Paper VII.*—Text—Prose (ornate) ... 100 marks.

*Paper VIII.*—Text—Prose (simple) ... 100 marks.

#### GROUP B—(*Historical Literature*) [*Persian*]

*Paper V.*—Text—Historical Poetry ... 100 marks.

*Paper VI.*—Text—Prose—Tahiride and Ghaznawide periods ... 100 marks.

*Paper VII.*—Text—Prose—Saljuq and Tatar periods ... 100 marks.

*Paper VIII.*—Text—Prose—Safawide and Qachar periods ... 100 marks.

#### GROUP C—(*Historical Literature*) [*Indian*]

*Paper V.*—Text—Historical Poetry ... 100 marks.

*Paper VI.*—Text—Prose—Pre-Moghal period 100 marks.

<i>Paper VII.</i> —Text—Prose—Moghal (Baber-Akbar)	period ... 100 marks.
<i>Paper VIII.</i> —Text—Prose—Moghal (Jehangir and Shah Jahan)	period ... 100 marks.

GROUP D—(*Mysticism*)

<i>Paper V.</i> —Text—Mystical Poetry	... 100 marks.
<i>Paper VI.</i> —Text—Prose	... 100 marks.
<i>Paper VII.</i> —Philosophy of Mysticism	... 100 marks.
<i>Paper VIII.</i> —History of Mysticism	... 100 marks.

GROUP E—(*Philology*)

*Paper V.*

- |                                       |                 |
|---------------------------------------|-----------------|
| (a) General Principles of Linguistics | } .. 100 marks. |
| (b) History of the Persian Script     |                 |

*Paper VI.*

Text

- |  |                |
|--|----------------|
| (a) Avesta   | } . 100 marks. |
| (b) Old Persian (including elements<br>of Grammar) |                |

*Paper VII.*

- |   |                |
|---|----------------|
| (a) Pahlavi Text (including<br>elements of Grammar) | } . 100 marks. |
| (b) Semitic Influence on Persian<br>Language        |                |

*Paper VIII.*

- |  |             |
|--|-------------|
| (a) Historical Grammar of the Iranian<br>Languages | . 50 marks. |
| (b) Sanskrit                                       | . 50 marks. |

Only such students will be permitted to take up this Group as have passed the B.A. Examination with Honours in Persian or M.A. Examination in any other Group in Persian.

4. A candidate who has taken his B.A. Degree with Honours in Persian may, subject to the conditions specified below, offer a thesis connected with some department of the subject in lieu of examination in two papers. If the candidate has taken up Group B or C the thesis will be allowed to be substituted for Papers I and IV. If the candidate has taken up Group A, D or E, the thesis will be allowed to be substituted for Papers III and IV. The thesis may be written in Persian or in English.

5. The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows:—

(a) He must have completed one year's study of the M.A. course in Persian under University Lecturers or in a College affiliated in Persian up to the M.A. standard.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Arabic and Persian an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Arabic and Persian, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, at their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of the candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

6. The limits of subjects shall be defined and books shall be prescribed and recommended from time to time by the Board of Higher Studies concerned.

## HEBREW

The course shall include—

*Paper I.*—Passages from one of the books of the Hexateuch for translation, criticism and exegesis ... 75 marks.

English passage(s) for translation into Hebrew 25 marks.

*Paper II.*—Passages from one or more of the Prophetical Books for translation, criticism and exegesis ... 75 marks.

English passage(s) for translation into Hebrew 25 marks.

*Paper III.*—Passages from the Old Testament Poetical Books for translation, criticism and exegesis 100 marks.

*Paper IV.*—Unseen passages from the Old Testament ... 100 marks.

*Paper V.*—*Either* (A) Passages for translation into English from prescribed post-Biblical books with questions arising out of the subject-matter of the texts ... 100 marks.

Or (B) Passages for translation into English from specified books in Syriac, including always a portion of the Peshitto version of the New Testament, together with questions on the language and subject-matter of the passages set.

*Paper VI.*—History of Jewish Religion and Civilisation from the earliest times to the destruction of Jerusalem (A.D. 70) ... 100 marks.

*Paper VII.*—History and contents of Hebrew Literature, Biblical and post-Biblical ... 100 marks.

*Paper VIII.*—Essay on a subject connected with the course ... 100 marks.

Papers I, II and III shall include questions on Grammar and Philology.

### SYRIAC

1. The course in Syriac shall comprise—

#### *Paper I*

The General History of Syriac Literature ... 100 marks.

#### *Paper II*

Prescribed Poetical texts ... 100 marks.

#### *Paper III*

Prescribed texts dealing with Martyrology ... 100 marks.

#### *Paper IV*

Prescribed Biblical texts ... 100 marks.

#### *Paper V*

Texts specially prescribed for their Philological matter ... 100 marks.

#### *Paper VI*

Prescribed Historical texts ... 100 marks.

#### *Paper VII*

Prescribed Ritualistic texts ... 100 marks.

#### *Paper VIII*

Syntax and Essay ... 100 marks.

2. The course shall include prescribed texts in Prose and Poetry and the outlines of Syriac Literature and Language and Comparative Semitic Philology.



The Syndicate, on the recommendation of the Board of Higher Studies concerned, shall, from time to time, prescribe such text-books as may seem to them desirable, and define the scope of the subject of each paper. The Syndicate may also, on the recommendation of the Board of Higher Studies, modify the distribution of marks in such manner as may seem desirable.

3. Questions on the prescribed texts shall include—

(i) Passages for translation into English, not carrying more than 25 marks in any one paper.

(ii) Questions on the subject-matter and language of the passages set.

### GREEK

The course shall include—

#### *Paper I*

- |   |     |           |
|---|-----|-----------|
| (a) Passages from prescribed Prose texts                        | ... | 70 marks. |
| (b) Unseen passages of Greek Prose for translation into English | ... | 30 marks. |

#### *Paper II*

- |  |     |           |
|--|-----|-----------|
| (a) Passages from prescribed Poetry texts                        | ... | 70 marks. |
| (b) Unseen passages of Greek Poetry for translation into English | ... | 30 marks. |

#### *Paper III*

- |  |     |           |
|--|-----|-----------|
| (a) Passages from prescribed Greek Plays                                   | ... | 70 marks. |
| (b) Unseen passages from the Greek Dramatists for translation into English | ... | 30 marks. |

#### *Paper IV*

- |  |     |            |
|--|-----|------------|
| Passages in English for translation into Greek Prose | ... | 100 marks. |
|--|-----|------------|

#### *Paper V*

- |   |     |            |
|---|-----|------------|
| The Philology of the Greek tongue and the elements of Comparative Philology | ... | 100 marks. |
|---|-----|------------|

#### *Paper VI*

- |   |            |
|---|------------|
| The General History and Antiquities of Greece | 100 marks. |
|---|------------|

#### *Paper VII*

- |                             |                |
|-----------------------------|----------------|
| History of Greek Literature | ... 100 marks. |
|-----------------------------|----------------|

#### *Paper VIII*

- |   |                |
|---|----------------|
| Essay on some subject connected with the course | ... 100 marks. |
|---|----------------|

In Papers I, II and III the questions on prescribed texts shall include—

- (i) Passages for translation into English, which shall not carry more than 25 marks in any one paper.
- (ii) Questions on the subject-matter and language of the texts.

### LATIN

The course shall include—

#### *Paper I*

Passages from prescribed Poetry texts

#### *Paper II*

Passages from prescribed Prose texts.

#### *Paper III*

Unseen passages from Latin authors for translation into English.

#### *Paper IV*

Passages in English for translation into Latin Prose.

#### *Paper V*

The Philology of the Latin tongue and the elements of Comparative Philology.

#### *Paper VI*

The General History and Antiquities of Rome.

#### *Paper VII*

History of Classical Latin Literature.

#### *Paper VIII*

Essay on some subject connected with the course.

In Papers I and II the questions on the prescribed texts shall include

- (i) Passages for translation into English, which shall not carry more than 25 marks in any one paper.
- (ii) Questions on the subject-matter and language of the texts.

## FRENCH

The course shall include—

*Paper I*—General History of French Literature.

*Paper II*—Drama.

*Paper III*—Poetry.

*Paper IV*—Prose.

*Paper V*—Historical Grammar of the French Language.

*Paper VI*—Essay (to be written in French).

GROUP A—(*Literary*)

*Paper VII*—Any one of the following periods:—

- (a) From the 14th to the 16th Century (from the Middle Ages to the Renaissance).
- (b) The 17th Century (The Classical Movement).
- (c) From the 18th Century down to the French Revolution.

*Paper VIII*—Any one of the following periods:—

- (a) The Romantic Movement.
- (b) From 1800 to 1870.
- (c) From 1870 to 1914.
- (d) From 1914 down to the present day.

GROUP B—(*Linguistics*)

*Paper VII* }  
*Paper VIII* } —Two out of the three following courses:—

- (a) Development of the French Speech out of Latin through Folk Latin (Vulgar Latin) with elements of Latin (studied through Grammar and simple Texts in Prose and Verse) and General Linguistics of the Romanic Languages.
- (b) Development of French from Old French onwards (studied through Texts of Old, Middle and Early Modern French).
- (c) Evolution of French Poetical forms.

## GERMAN

The course shall include—

*Paper I*—General History of German Literature.

*Paper II*—Drama.

*Paper III*—Poetry.

*Paper IV*—Prose.

*Paper V*—Historical Grammar of the German Language.

*Paper VI*—Essay (to be written in German).

GROUP A—(*Literary*)

*Paper VII*—Any one of the following periods:—

- (a) From 1500 to 1700.
- (b) From 1700 to 1760.

*Paper VIII*—Any one of the following periods:—

- (a) From 1760 to 1830.
- (b) From 1830 to 1914.
- (c) From 1914 down to the present day.

GROUP B—(*Linguistics*)

*Paper VII*—Germanic Linguistics (with special reference to the origin of High German) and Gothic (studied in Grammar and Texts).

*Paper VIII*—Development of German from the earliest times to the present day (studied through Texts of Old, Middle and Modern German).

## MODERN INDIAN LANGUAGE

1. Candidates will be examined in a Modern Indian Language as principal subject to be selected from a list prescribed from time to time by the Executive Committee on the recommendation of the Board of Higher Studies in Modern Indian Language.

2. The list shall include the following languages for the time being:—

- (i) Bengali.
- (ii) Assamese.
- (iii) Oriya.
- (iv) Hindi.
- (v) Urdu.

3. The course in Modern Indian Language shall be as follows:—

## I. BENGALI

*Paper I.*

History of Literature	...	... 100 marks.
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*Paper II.*

Poetry Texts	...	... 70 marks.
Unseens	...	... 30 marks.

*Paper III.*

Prose Texts	...	...	70 marks.
Principles of Criticism	...	...	30 marks.

*Paper IV.*

Drama	...	...	70 marks.
Essay	...	...	30 marks.

*Paper V.*

A special period of literature before 1800	...	100 marks.
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*Paper VI.*

A special period of literature after 1800	...	100 marks.
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*Paper VII.*

Either, Sanskrit (not for those who had Sanskrit for their B.A. Examination)	...	100 marks.
Or, one Modern Indo-Aryan Language:—Assamese, Oriya, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)		

*Paper VIII.*

(a) Historical and Comparative Grammar of Bengali	...	50 marks.
(b) Elementary Middle Indo-Aryan texts	...	50 marks.

## II. ASSAMESE

*Paper I.*

History of Literature	...	100 marks.
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*Paper II.*

Poetry Texts	...	70 marks.
Unscens	...	30 marks.

*Paper III.*

Prose Texts	...	70 marks.
Principles of Criticism	...	30 marks.

*Paper IV.*

Drama	...	70 marks.
Essay	...	30 marks.

*Paper V.*

A special period of literature before 1800	...	100 marks.
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*Paper VI.*

A special period of literature after 1800 ... 100 marks.

*Paper VII.*

*Either*, Sanskrit (not for those who had Sanskrit for their B.A. Examination) ... 100 marks.

*Or*, one Modern Indo-Aryan Language:—Bengali, Oriya, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

(a) Historical and Comparative Grammar of Assamese ... 50 marks.

(b) Elementary Middle Indo-Aryan texts ... 50 marks.

## III. ORIYA

*Paper I.*

History of Literature ... 100 marks.

*Paper II.*

Poetry Texts ... 70 marks.

Unseens ... 30 marks.

*Paper III.*

Prose Texts ... 70 marks.

Principles of Criticism ... 30 marks.

*Paper IV.*

Drama ... 70 marks.

Essay ... 30 marks.

*Paper V.*

A special period of literature before 1800 ... 100 marks.

*Paper VI.*

A special period of literature after 1800 ... 100 marks.

*Paper VII.*

*Either*, Sanskrit (not for those who had Sanskrit for their B.A. Examination) ... 100 marks.

*Or*, one Modern Indo-Aryan Language:—Bengali, Assamese, Hindi, Urdu. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

- |   |     |     |           |
|---|-----|-----|-----------|
| (a) Historical and Comparative Grammar of Oriya | ... | ... | 50 marks. |
| (b) Elementary Middle Indo-Aryan texts          | ... | ... | 50 marks. |

## IV. HINDI

*Paper I.*

- |                       |     |     |            |
|-----------------------|-----|-----|------------|
| History of Literature | ... | ... | 100 marks. |
|-----------------------|-----|-----|------------|

*Paper II.*

- |              |     |     |           |
|--------------|-----|-----|-----------|
| Poetry Texts | ... | ... | 70 marks. |
| Unseens      | ... | ... | 30 marks. |

*Paper III.*

- |                         |     |     |           |
|-------------------------|-----|-----|-----------|
| Prose Texts             | ... | ... | 70 marks. |
| Principles of Criticism | ... | ... | 30 marks. |

*Paper IV.*

- |       |     |     |           |
|-------|-----|-----|-----------|
| Drama | ... | ... | 70 marks. |
| Essay | ... | ... | 30 marks. |

*Paper V.*

- |  |     |     |            |
|--|-----|-----|------------|
| A special period of literature before 1800 | ... | ... | 100 marks. |
|--|-----|-----|------------|

*Paper VI.*

- |   |     |     |            |
|---|-----|-----|------------|
| A special period of literature after 1800 | ... | ... | 100 marks. |
|---|-----|-----|------------|

*Paper VII.*

- Either*, Sanskrit (not for those who had Sanskrit for their B.A. Examination) ... 100 marks.
- Or*, one Modern Indo-Aryan Language:—Bengali, Assamese, Oriya, Urdu. (The list may be added to by the Executive Committee from time to time.)

*Paper VIII.*

- |   |     |     |           |
|---|-----|-----|-----------|
| (a) Historical and Comparative Grammar of Hindi | ... | ... | 50 marks. |
| (b) Elementary Middle Indo-Aryan texts          | ... | ... | 50 marks. |

## V. URDU

*Paper I.*

- |                       |     |     |            |
|-----------------------|-----|-----|------------|
| History of Literature | ... | ... | 100 marks. |
|-----------------------|-----|-----|------------|

*Paper II.*

- |              |     |     |           |
|--------------|-----|-----|-----------|
| Poetry Texts | ... | ... | 70 marks. |
| Unseens      | ... | ... | 30 marks. |

*Paper III.*

Prose Texts	...	...	70 marks.
Principles of Criticism	...	...	30 marks.

*Paper IV.*

Drama, Unseens and Essay	...	...	100 marks.
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*Paper V.*

A special period of literature before 1800	...	...	100 marks.
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*Paper VI.*

A special period of literature after 1800	...	...	100 marks.
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*Paper VII.*

Either, Persian (not for those who had Persian for their B.A. Examination)	...	...	100 marks.
Or, one modern Indo-Aryan Language:—Bengali, Assamese, Oriya, Hindi. (The list may be added to by the Executive Committee from time to time.)			

*Paper VIII.*

(a) Historical and Comparative Grammar of Urdu	...	...	50 marks.
(b) Elementary Middle Indo-Aryan texts	...	...	50 marks.

## GENERAL

Each of the eight Papers shall carry 100 marks.

The scope of the subject included in each paper shall be defined and suitable text-books (including texts in Sanskrit, Persian and Modern Indo-Aryan Languages) and periods of literature recommended from time to time by the Board of Higher Studies in Modern Indian Language.

In Paper IV, the essay to be composed must, in all cases, be in the language of the Principal subject taken up.

In Paper VII, besides the study of the prescribed texts candidates will be expected to possess a fair knowledge of the Grammar of Sanskrit, or Persian, or of the Modern Indo-Aryan Language selected, as well as ability to translate easy passages from and into the language taken up.

In Paper VIII, part (a) shall be devoted to Indo-Aryan or other prescribed branch of Philology, in so far as it elucidates the origin and development of the Principal language taken up; and part (b) shall include questions on easy prescribed texts and simple questions on Grammar.

A candidate who has taken his B.A. Degree with Honours in a language, or has taken his M.A. Degree in a language or



in Comparative Philology may, subject to the conditions specified below, offer a thesis connected with some department of the subject in lieu of examination in two papers. If the candidate has taken his M.A. Degree in Comparative Philology, the thesis will be allowed to be submitted in lieu of Papers VII and VIII. In all other cases the thesis may be submitted in lieu of Papers V and VI.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows:—

(a) He must have completed one year's study of the M.A. course in Modern Indian Language under University Teachers.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Modern Indian Language an application for permission to offer a thesis in lieu of part of the examination.

(c) The applicant shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Modern Indian Language, the thesis must be prepared under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Councils of Post-Graduate Teaching in Arts and Science at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners, and the maximum number of marks assigned to the thesis shall be 200. The Examiners may in their discretion subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

## COMPARATIVE PHILOLOGY

Eight Papers shall be set as follows:—

### A

Course for the Indo-Aryan Philology

#### *Paper I.*

General Principles of Philology and the Science of Language; Growth and Change in Language; Semantics; Language

**Types and Classification of Languages; History of the Science of Grammar and Linguistics in India and in the West.**

*Paper II.*

Phonetics, the Structure of the Vocal Organs, the Production and the Classification of Speech Sounds, with special reference to the sound system of English and of Bengali (or of the candidate's mother-tongue); Phonetic Script; Linguistic Palæontology as illustrated in the Indo-European Languages: Outlines of the History of Writing, with special reference to the Scripts of India.

*Paper III.*

Comparative Grammar of Sanskrit (Old Indo-Aryan).

*Paper IV.*

Comparative Grammar of Pali-Prakrit (Middle Indo-Aryan).

*Paper V.*

Comparative and Historical Grammar of Modern Indo-Aryan: Bengali (or the candidate's mother-tongue).

*Paper VI.*

Essays. (Two essays to be chosen out of five given subjects.)

*Alternative (a)—Aryan and Indo-European Philology*

*Paper VII.*

(Aryan) Indo-Iranian Philology with Elements of Avesta and Old Persian.

*Paper VIII.*

Indo-European Philology with Elements of Greek.

*Alternative (b)—Philology of the Non-Aryan Languages of India*

*Paper VII.*

Dravidian Philology with Elements of Tamil.

*Paper VIII.*

Kol (Munda) and Tibeto-Burman Philology with Elements either of a Kol speech or of Tibetan.

**B.**

*Course for Iranian Philology*

*Paper I.*

General Principles of Philology and the Science of Language; Growth and Change in Language; Semantics; Language

## Types and Classification of Languages; History of the Science of Linguistics in the East and in the West.

### *Paper II.*

Phonetics, the Structure of Vocal Organs, the Production and the Classification of Speech Sounds with special reference to the sound system of English and of Bengali (or of the candidate's mother-tongue); Phonetic Script; Linguistic Palaeontology as illustrated in the Indo-European Languages; Outlines of the History of Writing, with special reference to the Scripts of Persia.

### *Paper III.*

Avesta and Old Persian (Old Iranian).

### *Paper IV.*

Pahlavi and Middle Iranian.

### *Paper V.*

Modern Iranian.

### *Paper VI.*

Essays. (Two essays to be chosen out of five given subjects.)

### *Paper VII.*

Sanskrit and the Elements of Indo-Aryan Philology.

### *Paper VIII.*

Arabic with the elements of Semitic Philology: Semitic Influence on the Development of the Persian Language.

A candidate who has taken his B.A. degree with Honours in Linguistics or in a Language, or has taken his M.A. degree in a Language may, subject to the conditions specified below, offer a thesis on any subject included within the scope of Paper III or IV or V in lieu of an examination in one of the above papers and Paper VI.

The conditions to be fulfilled by a candidate who is allowed to offer a thesis are as follows:—

(a) He must have completed one year's study of the M.A. course in Comparative Philology under University Teachers.

(b) He must, at the end of the year, submit to the Board of Higher Studies in Comparative Philology an application for permission to offer a thesis in lieu of part of the examination.

(c) The application shall indicate the subject and scope of the thesis he wishes to offer and must be recommended by the Professor or Professors under whom he has been working.

(d) If the application be granted by the Board of Higher Studies in Comparative Philology, the thesis must be prepared

under the general direction of the Professor or Professors with whom the candidate is prosecuting his studies.

(e) The candidate shall deliver three copies of the thesis (printed or type-written) to the Secretary to the Council of Post-Graduate Teaching in Arts, at least one month before the first day of the M.A. Examination at which he intends to present himself.

(f) The thesis shall be examined by a Board of three Examiners and the maximum number of marks assigned to the thesis shall be 200. The Examiners may, in their discretion, subject the candidate to a *viva voce* examination on the subject of the thesis.

(g) The name of a candidate whose thesis has been approved shall be marked with an asterisk in the list of successful candidates published in the *Gazette* and also in the *University Calendar*.

## MENTAL AND MORAL PHILOSOPHY

1. The course in Mental and Moral Philosophy shall be as follows:—

### *Paper I.*

History of Ancient and Mediæval European Philosophy.

### *Paper II.*

History of Modern European Philosophy.

### *Paper III.*

Indian Philosophy.

### *Papers IV and V.*

Theory of Knowledge and Metaphysics.

### *Papers VI and VII.*

Any one of the following subjects to be selected by the candidate, two papers being set in each:—

- (i) Psychology, (ii) Logic, (iii) Ethics and Social Philosophy,
- (iv) Philosophy of Religion, (v) Some special branch of Indian Philosophy, (vi) Political Philosophy, (vii) Aesthetics.

### *Paper VIII.*

Essay.

2. Questions bearing on General Philosophy and Metaphysics may be included in any paper.

3. The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Studies concerned.

## HISTORY

1. The course in History shall be as follows:—

*Paper I.*

A selected period of English History.

*Paper II.*

A selected period of Indian History.

*Paper III.*

General History of the Ancient East.

*Paper IV.*

Constitutional History of England.

*Paper V.*

International Law.

*Papers VI and VII.*

Two papers in one of the following subjects to be selected by the candidate:—

- (i) The History of Islam.
- (ii) A special period of Indian History.
- (iii) Economic History of England and India.
- (iv) Comparative Politics.
- (v) A special period of European History, or such other special subjects as may, from time to time, be prescribed by the Syndicate.

*Paper VIII.*

Essay.

2. Books shall be recommended and periods selected by the Board of Studies concerned to indicate the extent and standard of knowledge required.

## ANCIENT INDIAN HISTORY AND CULTURE

Candidates who take up the subject must possess a competent knowledge of Sanskrit so as to be able to refer to the sources in original.

## COMPULSORY PAPERS

1. General History of Vedic and Epic India.
- 2-3. Political History of the Post-Epic Period.
4. Historical Geography of Ancient India.

One of the following groups:—

(i) *Archæology*

## A

- 5-8. Epigraphy, Palæography and Numismatics.

## B

- 5-8. Fine Arts, Iconography and Ancient Architecture.

(ii) *Social and Constitutional History*

5. Social life, including manners, customs and ceremonies.
6. Economic life.
7. Administration.
8. Ethnology.

(iii) *Religious History*

5. Vedic Religion.
6. Epic and Pauranik Religions.
7. Buddhism.
8. Jainism.

(iv) *Astronomy and Mathematics*

5. Astronomy.
6. Astronomy.
7. Mathematics.
8. Mathematics.

(v) *Anthropology*

5. Physical Anthropology including origin and antiquity of man.
6. Social Anthropology.
7. Pre-historic Archæology and Technology.
8. Indian Ethnography.

In each Group a subject for an essay shall be set in one of the papers, which will carry half the value assigned to that paper.

The Board of Higher Studies may, from time to time, vary the alternative groups.

## ISLAMIC HISTORY AND CULTURE

*(Compulsory Papers)**Paper I.*

Rise of Islam and the Caliphate (Early Caliphate, Ommayyads or Abbasides—a Special Period to be selected).

*Paper II.*

History of Islam in India (the subject is to be studied with reference to original sources including Coins).

*Paper III.*

History of Islamic States (Modern).

*Paper IV.*

Geography (in relation to the history of Islam).

Any *one* of the following groups:—

A. *Religious History**Paper V.*

Islam—its principles and practices.

*Paper VI.*

History of Theological Development.

*Paper VII.*

Qoran and Hadis—their history and interpretation.

*Paper VIII.*

Islamic Philosophy and its Development.

B. *Islamic Culture and Civilisation**Paper V.*

Social Institutions.

*Paper VI.*

Political Institutions.

*Paper VII.*

Fine Arts and Architecture.

*Paper VIII.*

Science and Literature.

*C. History of Islam outside India**Paper V.*

Spain and Northern Africa (including Egypt).

*Paper VI.*

Iran and Central Asia.

*Paper VII.*

Turkey.

*Paper VIII.*

Arabia, Syria, Iraq, China and the East Indies.

*D. History of Islam in India**Paper V.*

Bengal (the subject is to be studied with special reference to epigraphic and numismatic sources).

*Paper VI.*

A Province in India other than Bengal.

*Paper VII.*

Special Period of the history of Pre-Mughal India.

*Paper VIII.*

Special Period of the history of Mughal India.

*E. Cultural History of Islam in India**Paper V.*

Public Administration.

*Paper VI.*

Influence on Indian Languages.

*Paper VII.*

Influence on Fine Arts and Architecture.

*Paper VIII.*

Economic and Social History.



**F. Law***Paper V.*

History of Islamic Law in India.

*Paper VI.*

History of Islamic Law outside India.

*Paper VII.*

Comparative Study of Different Schools of Islamic Law.

*Paper VIII.*

Muslim Law as administered in British India.

**G. Epigraphy and Numismatics***Paper V.*

Select Inscriptions of India during Muslim rule.

*Paper VI.*

Coins of India during the Muslim period.

*Paper VII.*

- (a) Select Inscriptions of Islamic Countries outside India.
- (b) Development of Arabic and Persian Scripts.

*Paper VIII.*

Coins of Muslim Countries outside India.

In each Group a subject for an Essay shall be set in one of the papers which will carry half the value assigned to that paper.

The Board of Higher Studies may, with the approval of the Executive Committee, from time to time, vary the alternative groups or the subjects comprised therein.

**POLITICAL ECONOMY AND POLITICAL  
PHILOSOPHY**

1. There shall be two groups in this subject, the first five papers being common to both, namely:—

*For Groups A and B**Paper I.*

General Principles of Economics.

*Paper II.*

General Principles of Political Science.

*\* Paper III.*

Public Administration, including administration in India.

*\* Paper IV.*

Public Finance, including Indian Finance.

*Paper V.*

Indian Economics, with a special study of select problems, to be prescribed by the Board of Higher Studies from time to time.

FOR GROUP A—(*Economics*)*Paper VI.*

History of Economic Thought, with an Outline of Economic History since the Industrial Revolution.

*Papers VII and VIII.*

Two papers on one of the following subjects:—

(i) The History, Theory and Present Systems of Banking and Currency.

(ii) The History, Theory and Present Organisation of International Trade.

(iii) Theory and Practice of Statistics including Demography.

(iv) Analytical and Mathematical Economics.

(v) Modern Economic Development,  
or such other subjects as may, from time to time, be prescribed by the Board of Studies concerned.

FOR GROUP B—(*Political Science*)*Paper VI.*

History of Political Thought.

*Papers VII and VIII.*

Two papers on one of the following subjects:—

(i) Comparative Study of Political Institutions.

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\* It is contemplated that at the examination one-half of each of these papers will consist of questions relating to India.

(ii) Sociology, Theoretical and Applied.  
 (iii) Public International Law.  
 (iv) Constitutional and Administrative Law,  
 or such other subjects as may, from time to time, be prescribed  
 by the Board of Studies concerned.

2. The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Studies concerned.

## COMMERCE

1. The course shall include the following subjects:—

Realistic Economics.  
 Business Organisation.  
 Inland and Foreign Trade.  
 Industrial structure and development.  
 Accounting.  
 Commercial Law.  
 Economic History.  
 Economic Geography.  
 Currency.  
 Banking.  
 Insurance.  
 Transport.  
 Tariffs.  
 Public Finance.  
 Statistics.  
 Mathematical Economics.  
 Agricultural Economics.

Other subjects may be added to the above list, from time to time, by the Board of Higher Studies in Commerce.

2. One paper shall be set in each subject unless the Board of Higher Studies otherwise determines.

3. Candidates shall be examined ordinarily in eight subjects; of these, not less than four and not more than six shall be compulsory subjects, the remaining subjects shall be left to the choice of the candidates.

4. The Board of Higher Studies in Commerce shall, from time to time, determine what subjects shall be deemed compulsory.

5. The limits of the subjects shall be defined and books shall be recommended, from time to time, by the Board of Higher Studies concerned so as to indicate generally the extent and standard of knowledge required.

6. This course will be open only to students who have taken Economics as a subject for the B.A. Examination, or have otherwise satisfied the Board that they possess a competent preliminary knowledge of that subject.

### GENERAL

1. (a) In order to pass in subjects I to XIV-A a candidate must obtain 288 marks in the aggregate. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks, those marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class, and those obtaining 480 marks in the First Class.

(b) In order to pass the subjects XV to XXV a candidate must conform to the rules laid down in the Regulations for the M.Sc. Examination.

2. As soon as possible after the examination, the Syndicate shall publish a list of candidates who have passed in each subject, arranged in three classes and in order of merit. Candidates shall be bracketed together unless the Examiners are of opinion that there is clearly a difference in their merits.

Each successful candidate shall receive with his Degree of M.A. a certificate setting forth the subject in which he was examined, and the class in which he was placed.

3. The candidate who is placed first in the First Class in each subject comprising groups, if any, shall receive a Gold Medal and a prize of books to the value of Rs. 200, and the candidate who is placed second in the First Class in each subject comprising groups, if any, shall receive a Silver Medal and a prize of books to the value of Rs. 100.

In the subjects (comprising groups if any) common to both the M.A. and the M.Sc. Examinations, the Medals and Prizes shall be awarded on the combined results of the M.A. and M.Sc. Examinations.

Provided that the Gold or Silver Medal shall not be awarded to the candidate if he does not secure First Class marks in the aggregate in the common papers and the Essay paper in the subject.

The candidate who obtains the highest number of marks in each group comprised in a subject and has been placed in the First Class shall receive a prize of books to the value of Rs. 100 provided he has not obtained any medal or prize under the preceding clause.

## CHAPTER XXXIV

### DOCTOR OF PHILOSOPHY

1. Any Master of Arts of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Philosophy provided three years have elapsed from the time when he passed the examination.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Arts, upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed upon some special portion of the subject so stated, embodying the result of research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself, or of new relations of facts observed by others, whether constituting an exhaustive study and criticism of the published work of others, or otherwise forming a valuable contribution to the literature of the subject dealt with or tending generally to the advancement of knowledge. The candidate shall indicate, generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and in what respects his investigations appear to him to tend to the advancement of knowledge.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the special subject professed by him, or of any cognate subject, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Arts or two Doctors of Philosophy shall have testified, to the satisfaction of the Syndicate, that in habits and character the candidate is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 200. No candidate who fails to pass or present him-

self for examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contribution, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board of three Examiners.

7. If the thesis is approved by the Board and if the candidate has obtained a First Class at the examination for the Degree of Master of Arts, he shall not be required to submit to any further written examination; but he may be required by the Board, at their discretion, to appear before them to be tested orally, or practically, or by both these methods, with reference to the thesis and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Philosophy, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of knowledge.

8. If the candidate is a person who has obtained a Second or a Third Class at the examination for the Degree of Master of Arts, and, if his thesis is approved by the Board, he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the written examination and also of the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Philosophy, they shall cause his name to be published, with the subject of his thesis, and the titles of the published contributions (if any) to the advancement of knowledge.

9. In the case of a candidate obtaining a Second Class at the Examination for the Degree of Master of Arts and falling under the preceding Regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of knowledge, hold the same to be generally or specially of such special excellence as to justify the exemption of the candidate from the written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University, and signed by the Vice-Chancellor, shall be delivered at the next Convocation for conferring Degrees to each candidate who has qualified for the Degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University with the inscription: "Thesis approved for the Degree of Doctor of Philosophy in the University of Calcutta."

## CHAPTER XXXIV-A

### BACHELOR OF COMMERCE

1. The examination for the Degree of Bachelor of Commerce shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any person may be admitted to the examination who, after passing the Intermediate Examination, has prosecuted a regular course of study for not less than two academical years in one or more colleges affiliated to the University for the purpose or in any classes held by the University.

3. Every candidate shall produce a certificate (a) of good conduct and (b) of diligent study, and shall send in his application with a certificate in the form prescribed by the Syndicate to the Controller of Examinations in time so that it may reach his office at least six weeks before the date fixed for the examination.

4. A fee of rupees forty-five shall be forwarded by each candidate along with his application. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted subsequently to one or more Degree Examinations in Commerce on payment of a like fee of rupees forty-five, subject to the provisions of Sections 4B and 4C.

4A. If a student, after completion of a regular course of study for the examination does not register himself as a candidate for, or present himself at, the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Head of the Institution at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes



a fresh course of study for at least six months immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination, he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this Section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures, does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied or, with the permission of the Syndicate, from the Principal of any other college affiliated to the University, that he has passed the test examination held by such a college immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a college or from a Member of the Senate, testifying to his good character during the intervening period.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the college at which he last studied or from a member of the Senate, testifying to his good character during the intervening period.

If the candidate obtains pass marks in the subject at the examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The Degree Examination in Commerce will be conducted by means of printed papers, the same papers being used at every place where the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in two divisions, the first in order of merit, and the other in alphabetical order. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any division or distinction. Every candidate on passing shall receive a certificate in the form prescribed.

7. Every candidate shall be examined in the following subjects:—

(1) English Composition including essay, précis writing and drafting of business letters:—

Essay—30 marks.	}	—one paper.
Précis writing 30 marks.		
Drafting of letters—40 marks.		

(2) One of the following languages:—

Bengali, Assamese, Hindi, Uriya, Urdu, Japanese,  
French, German and Italian—*one paper*.

(3) Accountancy—*one paper*.

(4) Commercial Law—*one paper*.

#### GROUP A

*Papers (5) and (6):*

General Economics—*one paper*.

Indian Economics—*one paper*.

## GROUP B

*Papers (7) and (8):*

Business Organisation—*one paper.*  
Commercial Geography—*one paper.*

## GROUP C

*Papers (9) and (10):*

Any *one* of the following:—

- (1) Advanced Accountancy—*one paper.*  
Auditing—*one paper.*
- (2) Trade and Tariff—*one paper.*  
Transport—*one paper.*
- (3) Banking—*one paper.*  
Currency—*one paper.*
- (4) Statistics—*one paper.*  
Insurance—*one paper.*
- (5) Public Administration—*one paper.*  
Public Finance—*one paper.*
- (6) Land Systems—*one paper.*  
Agricultural Economics—*one paper.*
- (7) Economic History—*one paper.*  
Modern Industrial Organisation with special reference to India—*one paper.*

8. Each paper shall be of three hours and shall carry 100 marks.

9. The limits of the subjects shall, from time to time, be defined by the Syndicate, on the recommendation of the Board of Studies concerned.

10. In order to pass, a candidate must obtain 30 per cent. of the marks in each subject or group of subjects and 40 per cent. of marks in the aggregate, provided that a candidate who takes up an Indian language must obtain 40 per cent. of the marks in the subject. In order to be placed in the First Division, he must obtain 60 per cent. of the marks in the aggregate.

11. The following syllabus defines the limits of subjects prescribed for the B.Com Examination.—

## ACCOUNTANCY

## (COMPULSORY)

The following course, in extension of that prescribed for Elements of Book-keeping in the I.A. Examination.

Definitions of commercial terms and various statements of account such as Balance Sheet, Profit and Loss Account, Ap-

appropriation Account, Income and Expenditure Account, Manufacturing Account, Receipts and Payments Account, Voyage Account, etc. The use of the various books of account including the Journal and the Petty Cash Book.

Principles of Double Entry Book-keeping—Preparation of Trial Balance and various statements of Account including the Balance Sheet.

Single Entry—Preparation of statements under Single Entry system. Comparison with Double Entry system and drawbacks of Single Entry system. Conversion of Single Entry into Double Entry.

Negotiable Instruments—Treatment of dishonoured and deferred bills.

Depreciation, Reserves, Reserve Funds and Sinking Funds.

Accounts Current and Average Due Date.

Goods on Sale or Return, Consignments and Joint Ventures

Simple cases of partnership Accounts, excepting dissolution of partnership but including a knowledge of Partnership Law.

Joint Stock Companies—Formation of Companies—Statutory and Statistical books—Various kinds of shares and debentures—and entries relating thereto, including forfeiture of shares and debentures—Preparation of final accounts and peculiarities to be observed in the case of banking institutions. A good knowledge of the Indian Companies Act is essential.

*N.B.*—Questions of an advanced character may be set on the matter prescribed for Elements of Book-keeping in the I.A. Examination.

## COMMERCIAL LAW

### (COMPULSORY)

Commercial Law—its scope and nature.

The Law of Contract—Communication, Acceptance and Revocation—Voidable Contract and Void Agreement—Coercion, undue influence, fraud, misrepresentation and mistake—Form and Consideration—Agreements—Novation—Recession—Alteration—Appropriation of payment—Breach of contract—Termination of contract—Relationship resembling those created by contract.

Agency—Sub-Agency—Ratification—Termination of Agency—Principal and Surety—Indemnity and Guarantee.

Bailment—Termination—Pawner and Pawnee—Mortgages of movable and immovable properties.

Mortgages—Simple Mortgage—Mortgage by conditional sale—Hypothecation.

The Contract of Carriage—Common Carrier—Railway Companies—Carriage of goods by sea and land.

Indian Partnership Act, 1932—Joint Hindu Family—Firm—Minor as partner—Registration of firm.

Indian Sale of Goods Act, 1930.

Law relating to Negotiable Instruments—Hundies—Promissory notes and Bills of Exchange.

Law of Arbitration—Indian Arbitration Act—Arbitration under the Civil Procedure Code.

Law relating to Companies—Public and Private Companies—Memorandum and Articles of Association—Prospectus—Capital—Directors—Resolutions—General, Statutory and Extraordinary Meetings—Loans, Mortgages and Debentures—Liquidation or Winding up.

Law relating to Fire and Marine Insurance.

Law relating to Insolvency—Presidency Town Insolvency Act—Provincial Insolvency Act.

#### GROUP A—PAPER (5)—GENERAL ECONOMICS—ONE PAPER

Definition and scope of economics—methods of study—fundamental economic concepts—wealth, utility, capital, income and value—consumption—the law of demand—elasticity of demand—wants and activities—production—factors of production—the laws of return—the law of population—modern industrial organisation—types of business organisation—industrial combination—trusts—national and international—cartels—market—theory of value—joint demand and joint supply—distribution—national dividend—rent, wages, interest and profits—labour problems—exchange—money, functions and value of money—Index numbers—credit and prices—monetary standard—monometallism and bimetallism—international gold standard—paper money—appreciation and depreciation—stabilisation—functions of banks—types of banks—reserves and investments—bank rate—Central banks—international trade—international values—the law of comparative costs—distribution of precious metals—the balance of trade—mechanism of international payments—foreign exchange—fiscal policy—export and import duties—public finance—equity in taxation—incidence of taxation—direct and indirect tax—progressive and proportional tax—economic functions of the state.

#### GROUP A—PAPER (6)—INDIAN ECONOMICS—ONE PAPER

Geographical factors—physical factors affecting the economic life of the people.

Special factors—village system and rural economy—caste—its economic significance—joint family—laws of inheritance—status and custom—organisation of agriculture, handicrafts and domestic industries of India—caste guilds—city industries—Mahomedan guilds—indigenous organisations of trade, transport, banking and agricultural credit.

Political factors—*Pax Britannica*—its economic effects—chief British Indian systems of land tenure—their economic consequences—political relation of India to England—effect on balance of trade.

Consumption—standard of life—comparison with other countries—statistics of consumption.

Production—principal crops—output in India and abroad—features of Indian agriculture—fragmentation and subdivision of holdings—agricultural indebtedness—pressure of population on land—economic transition in India—growth of large-scale industries—efficiency of labour—technical education—labour legislation—capital requirements—foreign capital.

Distribution national income—*per capita* income—rent as affected by state landlordism—by permanent settlement—tenancy legislation—custom—wages of different occupations—average wage rates—real wages—profits—commercial and industrial.

Exchange, Currency and Banking—history of Indian currency—Currency Committees and Commissions—Paper Currency System—history of Indian prices.

Main constituents of the Indian banking system—Reserve Bank—Imperial Bank—Exchange Banks—Indian joint-stock banks—indigenous bankers—bill market—Industrial banks—land mortgage banks—co-operative banks.

Public Finance—Sources of Revenue and heads of expenditure—Central and Provincial—Home charges—Public Debt—finances of Bengal and Assam—Local Finance.

State and Industry—Industrial Policy—Tariffs and Transport—Import and Export duties—Cotton excise controversy—Discriminating protection—Imperial Preference—Protection to Steel, Cotton, Textile and Sugar Industries—Railways and Shipping.

## GROUP B—PAPER (7)—BUSINESS ORGANISATION— ONE PAPER

Economic basis of trade and industries—classification of trade and industries—scale of business units.

Different forms of business organisation and tests of their efficiency—individual proprietorship—partnership—joint-stock

companies—co-operative societies—federation organisations—pools—trusts—cartels—holding companies—amalgamation.

General knowledge of organisation and management of factory—considerations for laying out a factory—division of labour—various departments—control—different forms of wages—efficiency of labour—how to improve it—elementary cost accounting and costing methods.

Organisation of office—various departments—co-ordination—labour-saving devices—codes.

Organisation of trade—home, foreign—wholesale and retail—departmental store—multiple shops—co-operative societies—broker and middlemen—their functions and remuneration—mail-order business—salesmanship.

Tariffs—customs—and commercial practices in different countries.

Financing of trade and industries—Central Banks—Commercial Banks—Industrial Banks—Co-operative Banks—Agricultural Banks—Stock exchanges—Investment Trusts—various methods of inland and foreign remittances—methods of financing trade in different countries.

Produce Exchanges—Transaction in futures—Speculation.

Scientific Advertisement.

Insurance Organisation—various methods—Warehouses.

Organisation of chief industries and trades of India.

Preparation of Commercial instruments—Secretarial practice.

Institutions, both state and private, for the furtherance of trade—Representation of commercial interest in foreign countries.

Market quotations and market reports.

## GROUP B—PAPER (8)—COMMERCIAL GEOGRAPHY— ONE PAPER

Why we should study Economic Geography—its nature and scope—relation to other sciences.

Physical factors bringing about variation in the economic life of a people.

Non-physical causes affecting economic life—race—religion—Government—density of population—historical usage and customs—geographical inertia.

Different industries of the world—hunting—pastoral—mining—agricultural—manufacturing—factors bringing about localisation.

Different methods of transport—land—water—air—their advantages and disadvantages—routes of international importance—causes that bring about changes in the volume and direction of traffic.

Development of ports and inland trade centres—principles and illustrations.

Coins and Currencies of important countries of the world—weights, units of sale and units of shipment of principal commodities to and from various countries.

Geographical distribution of principal commercial commodities—conditions affecting their production and carriage—their chief markets.

Economic Geography of the principal countries of the world—climate, soil, etc.—distribution of population—principal economic products—chief industries—ports and cities—communications—trade balance and trade relationship.

Economic Geography of India in detail.

Economic Zones—their prospects and possibilities.

Prospects of economic development of different countries.

#### GROUP C—PAPERS (9) AND (10)—ADVANCED ACCOUNTANCY —ONE PAPER; AUDITING—ONE PAPER

##### ADVANCED ACCOUNTANCY

The following course in extension of that prescribed for the compulsory paper on Accountancy:—

Self-balancing ledgers.

Departmental Accounts, Branch Accounts and Foreign Exchange.

Double Accounts.

Higher portion of Partnership Accounts including dissolution of partnership. A very thorough knowledge of the Partnership Act is essential.

Higher portions of Joint-stock Company Accounts, including Bonus Shares, Reduction of Capital and Redemption of Debentures. Amalgamation and Reconstruction of Companies. A thorough knowledge of the Indian Companies Act will be presumed.

Bank and Insurance Accounts.

Royalty Accounts—Higher purchase accounts—Instalment payment purchase accounts—Investment Accounts and Stock exchange transactions.

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Miscellaneous Accounts including insurance claims—treatment of life policy taken over in satisfaction of debt due—Marine Insurance Accounts—Accounts of Charitable Institutions.  
Cost Accounts.

*N.B.*—Questions of an advanced character may be set on the subject-matter prescribed for the compulsory paper on Accountancy.

### AUDITING

Meaning and Object of Audit—qualifications which an Auditor must possess.

Audit of the books of original entry and the different ledgers—verification of assets and liabilities. Internal checks.

Audit of Trading and Manufacturing Accounts—Profit and Loss Account and Balance Sheet.

Special considerations in different classes of audit—Audit of accounts of sole traders, firms and companies

Divisible profits and dividends.

Liability of Auditors.

Investigations.

*Note.*—Some important case laws to be prescribed from time to time by the Board of Higher Studies in Commerce.

### GROUP C—PAPERS (9) AND (10)—TRADE AND TARIFF— ONE PAPER; TRANSPORT—ONE PAPER

#### TRADE AND TARIFF

Meaning of Trade—what it consists of—classification of trade—necessity for different classes—their evolution and present tendency.

Distinction between inland trade and foreign trade—their relative importance in different countries—theory of comparative costs—international values.

Procedure for export and import trade—for inland trade—documents used—invoice—bill of lading—charter party—railway receipt—insurance policy, etc.

Customs formalities—bonded warehouse—warehousing.

Financing of trade—both inland and foreign—foreign exchanges—bill of exchange—letter of credit—methods of financing trade in different countries.

Institutions for the furtherance of trade, both state and private—representation of commercial interests in foreign countries.

Review of trade—recent tendencies.

Market quotations and market reports.

Economic arguments for free trade—Qualifications to above arguments.

The rationale of protection—Diversification of Industry Argument—Infant Industry Argument—National Self-sufficiency Argument—Dumping and stability of production—Anti-dumping legislation—Bounty *vs.* Import duty.

The evils of protection—burden on consumers—tariffs and trusts—tariffs and inefficient methods of production—effect of tariff on the distribution of wealth.

Protective and Revenue Duties—Import Duties—their incidence—the effect of Import Duties on the price of dutiable articles.

Export duties for revenue and protection—consideration of the Indian export duties.

Reciprocity, Retaliation and Preference within the British Empire—India and Imperial Preference—Ottawa Agreement.

Problems of tariff administration—comparative merits of *ad valorem* and specific duties—administrative difficulties connected with *ad valorem* duties—problems of valuation

The development of commercial policy in India—the Indian import duties in revenue and protective aspects—the Cotton Excise Controversy—the post-war developments in Indian fiscal policy—policy of discriminating protection—Indian tariff problem in relation to cotton, steel and sugar industries.

## TRANSPORT

Organisation—Organisation of rail, road and water services—State ownership and State control of modern railways—capital and revenue expenditure on railways—railroad construction finance—pooling and agreements—classification of roads, and road maintenance—problem of road power—condition of carriage by railways as common carriers—the Carriers' Act—the rights and obligations of the consigners and the consignees under the Carriers' Act—the carriage of persons and animals by railways—passenger's luggage.

Rates and Regulations—Railway traffic—goods and passenger—passenger fares—passenger tickets—theory of railroad charges—railway rate-making in practice—competitive rates—flat rates discriminations—problems of special rates—problems of routing—rate wars—port rates and wagon load rates—adjusted and differential rates—terminal charges and block rates—reasonable rates—standard charges—Government control over

railway rates—British railways in and after the Great War—U. S. A. railways—Long and short haul classes in railway rates-making.

Indian Railways—Lord Dalhousie and Sir John Lawrence in the shaping of the Trunk line in Indian railway systems—the Whitehall in the Indian railway development of the 19th century and after—Government control over the Indian Railways—the Railway Board as organ of Government control—gauge problems and the problems of minimum rates over the Indian Railways—freight classifications and the Indian Railways Conference Association, the shaping of the freight structures for the Indian Railways—competition and co-ordination between the Indian Railways in rates-making. Problems of discriminative rates and co-ordinated freight tariff over the Indian Railways—Problem of reasonable rates and undue preference over the Indian Railways.

State purchase and State construction of the Indian Railways—The Indian guaranteed and the Branch Line Railways finance—The McKay, the Acworth, and the Inchcape Committees in the financial reorganisations of the Indian Railways—The Acworth Committee on the State management of the Indian Railways and provisions for their capital supply—The Acworth Committee on the new reform over the Indian Railways. The Indian Railway Act—The Indian Railways Rates Advisory Committee—The Indian Railways Rates policy in the shaping of the Indian industries.

## GROUP C—PAPERS (9) AND (10)—BANKING—ONE PAPER; CURRENCY—ONE PAPER

### BANKING

Banking Theory—Functions and economic services of banks—Types of banks—Commercial Banks—Exchange Banks—Industrial Banks—Savings Banks—Agricultural Banks.

General structure and methods of commercial banking—working capital—deposits—cheques—bank drafts and inland remittances—the management of banking resources—the short-term loan fund—market rate of discount—Loans and Advances—Investments—Acceptances—Cash Reserves—Recent tendencies of commercial banks—Amalgamation—Branch banking.

Constituent elements of the Money Market—Clearing House—Comparative study of the Big Five—the D's of Germany—the National Banks and State Banks of America—The Commercial Banks of India—the Imperial Bank of India—the indigen-

ous bankers and their services—Principal credit instruments used in indigenous banking.

Decentralised and Centralised banking system—Functions of the Central Bank—Co-operation with the other Central Banks—Monetary stabilisation through C. B. action—the Bank of England—the Federal Reserve system—the Reichsbank—the Bank of France—the Reserve Bank of India—the Bank for International Settlements—Canadian Banking system.

The Stock Exchange—its relation to the banking system—Speculation—Functions of the speculative dealers—the bulls and bears—the constitution of the Bombay and the Calcutta Stock Exchanges—Modern problems connected with them—the effects of Government borrowing on the Indian Money Market.

Foreign Exchange—the theory of Foreign Exchange—the means and mechanism of payment—fluctuations in the exchange rates—commercial bills of exchange—bank bills—finance bills—the letter of credit—London Acceptance Credit—Exchange arbitrage—the Arithmetic of Foreign Exchange—Reading of Money Market Article.

Banking practice—Relations between the banker and the customer—the deposit account—current account—cheques and bills of exchange—personal elements and securities—collection of bills and cheques—discounting of bills—daily balances—the general ledger—deposit receipt—purchase and sale of stocks and shares—Foreign Exchange business—gratuitous services.

Bank Management—Powers and duties of directors, shareholders and managers—bank officers—cashier—inspectors, etc.—Banking Organisation—Chartered Banks—Incorporated Banks—private banks—Indian Companies Act—The different types of bank accounts.

Banking law—Banker and the Customer—Banker's entries in the Pass Book—Paying Banker and the Collecting Banker—the Negotiable Instruments Act—Bankers and the guarantee—Legal and equitable mortgage—Bank's hold over different securities—Banker's lien and pledge—Banker's Book Evidence Act—Banking Legislation in America and India.

General Banking Statistics—The Bank balance-sheet, capital, reserve, deposits, total and immediate liabilities—proportion of cash as against outstanding liabilities—profitable and non-profitable assets—Clearing House Figures—Bank rate and Market rate.

## CURRENCY

The Economic Importance of Money—Definition of Money—Origin of Money—Functions of Money—Qualities of good money materials.

Evolution of Metallic Money and Coinage—Requisites of good coinage—limit of tolerance—seigniorage—brassage—gratuitous and free coinage—Mint price of gold—different types of Money—Standard Money—Token money—principles of token coinage—Representative paper Money—Fiat Money—Convertible and inconvertible paper money—deposit currency—Methods of regulation of note-issue—Gresham's law—Characteristics of a good currency system.

Value of Money—Quantity theory—measurement of changes in the value of money—Economic consequences of rising and falling prices—Price movements in the 19th and 20th centuries—Prices and international movement of specie—Monetary stability.

Monetary standards—Monometallism—Bimetallism—Gold-exchange standard—Gold bullion standard—Symmetallism—Tabular standard—Currency inflation and credit inflation—the effect of inflation—Restoration of the international gold standard—Deflation and devaluation—Suspension of the gold standard—Money and Business Cycles.

The Monetary System of India—Coinage Act of 1835—agitation for gold currency—Development of Government paper currency—fall in the value of silver—its consequence—Herschell Committee—closure of the Mints—the Fowler Committee—the Evolution of the G. E. Standard—the Chamberlain Commission—Effects of the War on Indian Currency and Exchange—breakdown of the Gold Exchange Standard—the Babington Smith Committee—the Hilton-Young Commission and the ratio controversy—the Currency Act of 1927—the suspension of Gold Standard—the linking of the rupee to sterling—Gold exports during 1929-33—purchase and sale of sterling—Government reserves for maintaining the value of currency—the gold standard reserve—the Cash balances—Government as the currency authority and exchange banker—Government's method of expanding and contracting currency.

## GROUP C—PAPERS (9) AND (10)—STATISTICS—ONE PAPER

### INSURANCE—ONE PAPER

#### STATISTICS

Definition and historical development of statistical science.  
Its uses, characteristics and sources.

Collection and analysis of data.

Definition, tabulation and formulation of Problems.

Frequency distribution and Graphs.

Graphical methods and interpolation.

Types and averages; weighted mean, its significance and use.

Dispersion; moments; standard deviation.

Time series, mortality tables, moving average, trend and fluctuation.

Index numbers and their uses.

Use of slide rules and other machines for tabulation, and sorting, such as comptometer, etc.

The main sources of official statistics, their character and meaning.

### INSURANCE

Insurance in general—its origin and uses. Insurance as a factor in business.

Fundamental principles of Insurance—Necessity of insurance and nature of insurable interest. Difference between insurance and gambling. The law of average in its application to insurance. Differences between life and other forms of insurance.

Under-writing of Insurance—Risks—Mortality Tables.

Life Insurance Premiums—number of ways in which premium payment can be made, and the merits of the current ones—basis of premium calculations.

Reserves, surrender and paid-up values and loans against policies. Assignment of policies.

Policy reserve.

Solvency Reserve *vs.* Reserve when the valuation is undertaken with a view to distribute profits.

Basis of Valuation.

Investments—types of investments usually chosen by Life offices.

Types of Insurance Organisations (mutual, proprietary, etc.) and classes of insurance combined with life assurance, such as, Disability Insurance.

Types of Insurance Policies—Annuities.

Organisation of Insurance business.

Insurance Law—Provident Insurance Societies Act, 1912, Indian Insurance Companies Act, 1913, and Indian Insurance Companies Act, 1928, and the rules framed thereunder—Returns.

Elements of the Law and Practice of—

(a) Marine Insurance.

(b) Miscellaneous Insurance.

Re-Insurance.

GROUP C—PAPERS (9) AND (10)—PUBLIC ADMINISTRATION—ONE PAPER; PUBLIC FINANCE—ONE PAPER

### PUBLIC ADMINISTRATION

Fundamental concepts.

Meaning of Constitution—characteristics of the English Constitution—its constituent elements.

The Executive—the Crown—powers of the Crown—the prerogative—Nature and functions of the Cabinet—Ministry—Privy Council—Ministerial responsibility—the War Cabinet—Cabinet Secretariat—Cabinet Committee of Imperial Defence.

Ministers and the Permanent Civil Servants—Government Departments.

The Legislature—the franchise—functions of the House of Commons—its privileges—legislative procedure—House of Lords—its composition and functions—the Parliament Act of 1911.

The Judiciary—organisation of the courts—Rule of Law—Liberty of the subject—Law and Equity.

Local Government Systems—Powers and duties of local authorities—local taxation—nature of local expenditure—Ministry of Health.

Federation and Unions—Outline of the constitutions of Canada, South Africa and Australia—Imperial Co-operation during the War—Imperial Conference—Colonial Laws Validity Act—Statute of Westminster—Crown Colonies, Protectorates and Mandated territories.

Government of India—A brief historical survey of the development of the Indian Constitution—the Secretary of State for India and his Council—control of the Secretary of State over administration—the Governor-General and the Executive Council—Central and Provincial subjects of administration—the Governor—his Executive Council and the Ministry—the dyarchy.

The Legislature—the Central Legislature—its powers and functions—provincial legislature—its control over administration and finance.

The Judiciary—organisation of the courts.

Indian States—The constitutional relation between the States and the Government of India.

### PUBLIC FINANCE

Introductory—The nature of Public Finance—principles of Public Expenditure—Central and local expenditure—division of financial duties between State and local bodies.

Public Revenues—Commercial Governmental revenues—principles underlying Government industrial enterprise—Tax—Revenues—the problem of justice in taxation—Taxable capacity—Double Taxation—shifting and incidence of taxation—Taxes on Income and Taxes on Property—Taxes on commodities—Taxes on Transactions—Taxes on corporations.

Central and Local Taxation.

Public Debts—its nature and necessity—forms of Public debts—conversion—repayment of public debts.

Indian Finance—a study of Indian Taxes in general—allocation of resources between Central and Provincial Governments—Indian Public Debts.

Financial Administration in India and Great Britain.

GROUP C—PAPERS (9) AND (10)—LAND SYSTEMS—ONE PAPER;  
AGRICULTURAL ECONOMICS—ONE PAPER

### LAND SYSTEMS

Land Tenure—types of Land Tenure in India—its nature—Occupancy and Non-occupancy Ryots—Sub-proprietary and tenant rights.

What is a Settlement? Principles and requisites of a settlement—classification of settlements—General outline of settlements—in British Baluchistan, Madras, Burma, Bombay, the United Provinces, Punjab and Central Provinces. Special settlement—Tea and Coffee Estates, Rubber Estates in Burma and Khasmahals—Permanent Settlement in Bengal—its objects and results. Position of the Zamindars before and after the settlement—Government and Ryots—the relation between Zemindars and Ryots. Tenancy Acts—Subinfeudation—criticism and suggested remedies.

Ownership of land—State *vs.* Individual—Land Revenue, & Tax or Rent?—Ricardian Theory in relation to land revenue in India—Application of the principles of taxation to land revenue—Legislative control—progress of Land Revenue Legislation.



A brief description of land tenures in the Western countries.

Problems in regard to Nationalisation of land—Re-distribution of Holding.

### AGRICULTURAL ECONOMICS

Factors of Production—Land, physical conditions with special reference to Bengal and Assam—Tenure—present law of land tenure—Rules of good husbandry—size and character of Holdings—Economic unit of farms, arrangement of farms with special reference to Bengal—Family farms—Large-scale farming—Government model farms.

Open field system—enclosure system—Arable and Grass farms.

Farm equipment, permanent and temporary—Animal and mechanical power.

Labour cost—agricultural wages—Index number of wages—harvest prices and Wages—Wages in agriculture and in industry.

Management, technical and economic—purchase of requisites—co-operative buying.

Cost of Production—Rent, Interest on capital, expenditure on land and implements, local rates and cesses—wages—current expenses—seed—fertilisers—feeding stuffs.

Farm Accounts.

Live-stock and Fertility maintenance.

Marketing—Methods of disposal—consumption by producers—direct sale—sale through intermediaries, the system of 'dadan' in Bengal and Assam—co-operative marketing—co-operative marketing in U. S. A., Denmark, Canada, Australia and Japan—recommendation of the Jute Enquiry Committee.

Markets—Fairs and *melas*—modern market—the cotton market in Borar and Amalner—the organisation of various trades, especially Rice, Wheat, Jute and Cotton—dealing in Futures—essential services in large-scale marketing—Grading.

Prices—conditions affecting supply and demand of Rice, Wheat, Jute and Cotton—Price variations—seasonal fluctuations—Index number of agricultural prices—monetary causes of price variations—control and regulation of produce—recommendations of the Jute Enquiry Committee.

Village Economic Survey.

Agricultural indebtedness—co-operative credit societies—land mortgage banks—debt conciliation—regulation of the rate of interest.

Rural industries subsidiary to agriculture.

GROUP C—PAPERS (9) AND (10)—ECONOMIC HISTORY—ONE PAPER; MODERN INDUSTRIAL ORGANISATION, WITH SPECIAL REFERENCE TO INDIA—ONE PAPER

ECONOMIC HISTORY

Elizabethan England—Policy of Burleigh—Trade and Trading Companies—Colonisation—Agriculture and Industry on the eve of the Industrial Revolution—Industrial Revolution—Agricultural Revolution—Inland and Oceanic Transport—Labour Movement—Labour Legislation—Poor Law Reform—Origin and Growth of Banking—Free Trade Movement—Agricultural Decline—Protectionist Reaction—Co-operative Movement—Industrial Combinations.

MODERN INDUSTRIAL ORGANISATION WITH SPECIAL REFERENCE TO INDIA

General industrial economy—Organisation of Industries—Handicraft system—Guild system—Domestic system—Factory system—Importance of Machinery—The place of Labour—Modern marketing organisation—Modern large-scale industries—Geographical causes of their existence—the Importance of raw materials—mobility of the factors of production—International Capital market—Industrial finance—Monopolistic tendencies—Trusts and Cartels—Labour organisation—Labour legislation—Industrial disputes—the problem of minimum wage—Arbitration—Joint Industrial Councils—Industrial Education.

Industrial organisation of India—Study of occupations—Importance of agriculture—Agricultural organisation—Systems of land tenures—Agricultural Finance—Co-operation—Agricultural Labour—State and Agriculture.

Cottage Industries—Decline of handicrafts—Growth of large-scale industries—Industrial deficiencies—special advantages—raw material and other natural resources—the problem of power—Industrial labour—efficiency of labour—Labour movement—Labour legislation—Technical education—Foreign capital and management—special study of the development of Cotton, Jute, Iron and Steel, Coal and Leather Industries—Industrial Finance—State and Industry—Fiscal Policy and Indian Industries.

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## CHAPTER XXXV

### INTERMEDIATE EXAMINATION IN SCIENCE

1. The Intermediate Examination in Science shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in one or more colleges affiliated for this purpose for not less than two academical years after passing the Matriculation Examination.

Any student who has passed the Intermediate Examination in Arts may take up the course of the Intermediate Examination in Science at the second year's stage, and after one year's regular course of study appear at the examination. He will be excused attendance and examination in the subject or subjects in which he has already passed at the Intermediate Examination in Arts.

3. Every candidate sent up for the Intermediate Examination in Science by an affiliated college shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College Examinations and other Tests, and (d) of probability of passing the examination. Every candidate for admission shall send in his application with a certificate in the form prescribed by the Syndicate either to the Registrar or to a local officer recognised by the Syndicate. Every such application must reach the office of the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of rupees thirty shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent Intermediate Examinations in Science on payment of a like fee of rupees thirty on each occasion, subject to the provisions of Sections 4B and 4C:

Provided that if a candidate, who has passed the Intermediate Examination in Arts or Science and is prosecuting his studies for a higher examination in a college affiliated to this University, is required by the University to appear in a special subject at the Intermediate Examination in Science, he shall pay a reduced fee of fifteen rupees only.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for, or present himself at, the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied, or from a Member of the Senate, testifying to his good character during the intervening period, and provided further that, in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said college or of any other affiliated college or from some other authority approved by the Syndicate, to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination, he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures, does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students

appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied or, with the permission of the Syndicate, from the Principal of any other college affiliated to the University, that he has passed the Test examination held by such a college immediately preceding the examination to which he seeks admission, and a certificate either from the Principal of such a college or from a Member of the Senate, testifying to his good character during the intervening period: Provided further that, in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said college or of any other college or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself.

Second, third and fourth paragraphs of Section 4A above shall apply to students referred to in this section.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 15, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the college at which he last studied or from a Member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other college affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The Intermediate Examination in Science shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in three divisions, the first in order of merit, and the second and third in alphabetical order. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any division or distinction. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A.

7. The subjects for the Intermediate Examination in Science shall be—

- (1) English ... Three papers.
- (2) One of the following vernacular languages:—Bengali, Hindi, Uriya, Assamese, Urdu, Burmese, Modern Armenian, Modern Tibetan, Marathi, Khasi, Nepali, Maithili, Gujrathi, Telugu, Tamil, Kanarese, Malayalam, Sinhalese, Portuguese, Manipuri, Sindhi, Persian, Punjabi (Gurumukhi).

The Syndicate shall have power to add to this list.

If the vernacular of a candidate is a language not included in the above list, he shall have an Alternative paper of a somewhat advanced character in English.

- (3) Chemistry.
- (4) Mathematics or Physics.
- (5) Any one of the following subjects:—
  - (i) Mathematics, if not taken up as the 4th subject.
  - (ii) Physics, if not taken up as the 4th subject.
  - (iii) Botany.
  - (iv) Zoology.
  - (v) Geology.
  - (vi) Geography.
  - (vii) Physiology.
  - (viii) Biology.
  - (ix) Anthropology.
  - (x) Psychology.

There shall be two papers in Mathematics. In each of the other subjects under sub-sections (3), (4) and (5) there shall be two theoretical papers and one practical paper.

8. Candidates may also be examined, if they so desire, in an additional subject included under (5), provided they have not already taken the subject, or in French or German or Italian, provided also that candidates shall not be allowed to take up Botany or Zoology if Biology has been taken as a Compulsory subject, or Biology if Botany or Zoology has been taken as a Compulsory subject, under Clause 7 (5). In Mathematics, French, German or Italian, there shall be two papers, and in any other subject there shall be two theoretical papers and one practical paper.

9. No student shall be permitted to take up Mathematics or Geography for the B.Sc. Examination unless he has taken it up for the Intermediate Examination.

No student shall be permitted to take up Physics or Chemistry for the B.Sc. Examination unless he has taken up both Mathematics and Physics for the Intermediate Examination.

No student shall be permitted to take up Psychology for the B.Sc. Examination unless he has taken up any one of the following subjects in the Intermediate Examination:—Psychology, Physiology, Biology or Physics.

No student shall be permitted to take up Botany for the B.Sc. Examination unless he has taken up Botany or Biology for the Intermediate Examination.

10. Each paper shall be of three hours. In English, Vernacular, Mathematics, French, German and Italian, each paper shall carry 100 marks. In each of the other subjects, each theoretical paper shall carry 75 marks and the practical paper 50 marks and of these 50 marks 10 marks shall be set apart for laboratory note books.

11. There shall be a practical examination in each science subject, and candidates shall be required to pass in the practical portion of the subject as well as in the theoretical portion defined in the Syllabus. Every student who desires to be examined in any such subject must produce a certificate from the Principal of his College to the effect that he has completed in an affiliated College the corresponding practical course prescribed by the Regulations.

12. The limits of the above subjects for both theoretical and practical work are defined below:—

#### ENGLISH, VERNACULARS, FRENCH, GERMAN

As in the Intermediate Examination in Arts.

## MATHEMATICS

## 1. ALGEBRA

Theory of Quadratic Equations and Expressions.

Simultaneous Quadratic Equations, one of which is linear.

Permutations and Combinations.

Variation.

Binomial Theorem for any rational index.

Theory of Indices.

Surds and Complex Quantities.

Logarithms, and their simple applications to Interest and Annuity.

Exponential and Logarithmic series.

## 2. TRIGONOMETRY

Measurement of angles.

Trigonometrical ratios.

Applications of algebraic signs; angles of any magnitude.

Graphs of trigonometrical ratios.

Elementary trigonometrical formulæ and their applications.

Logarithmic sines, cosines, etc.

Relations between the sides and angles of a triangle.

Practical solutions of triangles with application.

Elementary cases of Inverse Functions.

## 3. GEOMETRY

(a) *Pure Geometry*

## Parabola

1. Tracing the curves from definition.
2. Latus Rectum is four times the focal distance of the vertex.
3.  $PN^2 = 4 AS \cdot AN$ .
4. The middle points of parallel chords lie on a straight line parallel to the axis.
5. The parameter of any diameter of a parabola is four times the line joining the focus with the vertex of the diameter.
6.  $QV^2 = 4 BS \cdot BV$ .
7. If any chord  $QQ'$  intersects the directrix in  $D$ ,  $SD$  bisects the exterior angle between  $SQ$  and  $SQ'$ .
8. The tangent to the curve at its points of intersection with a diameter is parallel to the system of chords bisected by the diameter.
9. The portion of the tangent at any point intercepted between that point and the directrix subtends a right angle at the focus.



10. The tangent bisects the angle between the focal distance and the perpendicular on the directrix.
11. The sub-tangent is bisected at the vertex.

### Ellipse

1. Tracing the curve from the definition.
2. The ellipse is symmetrical with respect to the minor axis and has a second focus and directrix.
3.  $CS.CX = CA^2$ .
4.  $SP + S'P = AA'$ .
5.  $CB^2 = SA.SA'$ .
6. If any chord  $QQ'$  of an ellipse intersects the directrix in  $D$ ,  $SD$  bisects the exterior angle between  $SQ$  and  $SQ'$ .
7. The middle points of parallel chords lie on a straight line passing through the centre.
8. The tangent to the curve at either end of a diameter is parallel to the system of chords bisected by the diameter.
9. The portion of the tangent at any point intercepted between that point and the directrix subtends a right angle at the focus, and conversely.
10. The tangents at the ends of a focal chord intersect on the directrix.
11. The tangent at any point of an ellipse makes equal angles with the focal distances of the point.

### (b) *Elements of Co-ordinate Geometry*

Finding out the equations of a straight line, circle, parabola and ellipse in their simplest forms from geometrical properties:

$$\text{For Straight Line } \frac{x}{a} + \frac{y}{b} = 1.$$

$$\text{For Circle } x^2 + y^2 = a^2.$$

$$\text{For Parabola } y^2 = 4ax.$$

$$\text{For Ellipse } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

### (c) *Solid Geometry*

1. One and only one plane may be made to pass through any two intersecting straight lines.
2. Two intersecting planes cut one another in a straight line and in no point outside it.

3. If a straight line is perpendicular to each of two intersecting straight lines at their point of intersection, it is also perpendicular to the plane in which they lie.

4. All straight lines drawn perpendicular to a given straight line at a given point is coplanar.

5. If two straight lines are parallel, and if one of them is perpendicular to a plane, then the other is also perpendicular to the same plane.

6. (i) Of all straight lines drawn from an external point to a plane, the perpendicular is the shortest.

(ii) Of obliques, drawn from the given point, those which cut the plane at equal distances from the foot of the perpendicular are equal.

7. The projection of a straight line on a plane is itself a straight line.

8. If a straight line is perpendicular to a plane, any plane passing through the perpendicular is also perpendicular to the given plane.

9. The definition of dihedral and solid angles.

10. The students will be expected to have an idea of the following solids:—

Sphere, Right Circular Cylinder, Right Prism, Rectangular Parallelopipeds, Right Circular Cone, Square and Triangular Pyramids.

11. Expressions (without proof) of the surfaces and volumes of the solids mentioned above.

#### 4. ELEMENTARY STATISTICS AND DYNAMICS

(a) Uniform and uniformly accelerated motion, composition and resolution of velocities, accelerations, etc.

Definition of mass, momentum, force.

Newton's laws of motion.

Units of force and measurement.

Composition and resolution of forces acting at a point.

Simple illustrations of Newton's laws; projectiles, motion of a particle on an inclined plane, motion of two particles connected by a string, uniform circular motion.

(b) Equilibrium of forces

Resolution and composition of parallel forces in one plane.

Centre of parallel forces.

Centre of gravity. Mass centre.

Reduction of any system of coplanar forces acting on a rigid body to a single resultant force or couple. Conditions of equilibrium for coplanar forces.

Friction.

Machines.

(c) Impulse of a force.

Conservation of linear momentum for a system of particles.  
Simple cases of impact of two spherical bodies moving in the same plane.

Work and energy.

Application of the principle of energy to the solution of simple problems.

Two papers shall be set of three hours each, the first being allotted to Algebra, Plane Trigonometry and Geometry, and the second to Elementary Statics and Dynamics.

In all the subjects only such examples and questions may be introduced by way of illustration or explanation as arise directly out of the propositions themselves.

## PHYSICS

### THEORETICAL

The course in Physics shall be mainly experimental. Candidates will be expected to show general acquaintance with the apparatus by which elementary principles of Physics are illustrated and applied.

#### *General Ideas—*

Units of measurement—Lengths, Mass, Time-motion, Velocity, Acceleration, Momentum, Force, Moment of a force and couple. Work and Energy.

Laws of Motion.

Translatory motion, circular motion and simple harmonic motion.

Laws of pendulum.

General properties of solids, liquids and gases. Specific gravity.

Elasticity—Hook's Law. Young's modulus. Hydrostatic pressure and its measurement. Equilibrium of floating bodies.

Dalton's Law. Boyle's Law.

Syphon. Lift Pump. Hydraulic Press.

Barometer.

Air Pump.

#### *Heat—*

Expansion of solids, liquids and gases by heat.

Temperature and its measurement.

Quantity of Heat. Specific Heat. Changes of molecular state.

Melting point. Boiling point. Latent heat.  
 Vapour pressure.  
 Formation of Cloud, Fog and Dew.  
 Simple ideas on Hygrometry.  
 Radiation, Conduction and Convection of heat.  
 Heat and work. Conservation of Energy.  
 Working of steam engine and simple petrol engine.

### *Light—*

Propagation of light and elementary wave theory.  
 Velocity of light—Romar's method.  
 Formation of shadows, Photometry.  
 Reflection of light at plane and spherical surfaces and the formation of images.  
 Refraction of light across plane and spherical boundaries.  
 Formation of images by single lens.  
 Power of a lens.  
 Eye, vision, colour and colour sensation.  
 Spectacles.  
 Astronomical and Galilean Telescopes.  
 Binoculars, Compound Microscopes.  
 Magic Lantern, Cinematograph and Photographic Camera.  
 Prism, minimum deviation, chromatic dispersion, typical spectra and spectroscope.  
 Phosphorescence and Fluorescence.

### *Sound—*

Production and propagation of sound.  
 Nature of wave motion. Wave front. Wave length.  
 Frequency, amplitude and phase.  
 Velocity of sound in air. Experimental determination.  
 Effect of Pressure and Temperature on Velocity.  
 Reflection and refraction of sound waves.  
 Musical sound and noise—human ear.  
 Pitch and Quality of Tones.  
 Determination of pitch.  
 Tuning forks.  
 Vibration of Strings—Sonometer.  
 Beats.  
 Vibration of air column. Organ Pipe.  
 Phonograph.

### *Electricity and Magnetism—*

#### (1) Magnetism—

Properties of Magnets.  
 Methods of Magnetisation.

Magnetic pole. Lines of Force. Magnetic field. Laws of Magnetic force. Magnetic Intensity and Magnetic Induction. Magnetic Moment.

The Earth as a Magnet—Declination, Dip and Intensity.

Mariner's Compass.

(2) Frictional Electricity—

Nature of electricity. Electron. Electric charge.

Electrical attraction and repulsion. Lines of force.

Properties of conductors and insulators.

Electrical induction. Simple Electroscope.

The Laws of electric force.

Electric field; Strength of field.

Potential.

Distribution of charge on conductors.

Capacity.

Simple condensers, Leyden jars.

Specific Inductive Capacity.

Electrophorus. Influence Machines.

Electric discharge.

(3) Dynamical Electricity—

Voltaic cells. Electric current.

Magnetic effect of current.

Simple Galvanometers—suspended needle and suspended coil types.

Primary and Secondary batteries.

Electromotive force; difference of potential.

Ohm's law—Resistance.

Wheatstone's bridge.

Laws of Parallel and Series resistance.

Voltmeters and Ammeters.

Heating effects of current. Joule's Law.

Laws of Electrolysis.

Action of magnets on currents and of currents on magnets.

Burrow's wheel.

Solenoids, Electromagnets and Electric Bells.

Electromagnetic induction. Faraday's Laws. Lenz's Laws.

Electric Telegraphy. Telephone and Microphone.

Induction coil.

Thermo-electric couple.

Simple phenomena of discharge in gases.

### PRACTICAL

Length measurement of millimetre rule. Eye-estimation of tenths of a division.

- Use of Spirit level and plumb line.
- Verniers—linear and angular.
- Callipers.
- Screw gauges.
- Spherometer.
- Measurement of areas by plotting on squared paper.
- Measurement of angles by protractors.
- Verification of the laws of friction.
- Time of swing of a simple pendulum. Verification of the formula  $T^2$  varies as  $l$ .
- Use of Balance weighing to one centigramme.
- Determination of specific gravities of solids and liquids by the hydrostatic balance and Nicholson's hydrometer.
- Determination of specific gravity of a liquid by Hare's apparatus.
- Reading the Barometric height.
- Verification of Boyle's Law.
- Determination of fixed points of thermometers.
- Simple methods of determining specific heat; Latent heat of fusion of ice.
- Verification of the laws of reflection and refraction by pin method.
- Measurement of angle of deviation through a prism by pin method.
- Use of simple photometers.
- Refractive index of glass slab by the pin method.
- Focal length of concave mirrors and convex lenses.
- Determination of the poles of a bar magnet.
- Magnetisation on iron rod and the study of distribution of magnetism along it with iron filings.
- Tracing the lines of force in the neighbourhood of a magnet.
- Setting up Daniell, Bunsen and Leclanché cells.
- Use of simple galvanometers.
- Measurement of resistance by a simple form of Wheatstone's Bridge. Verification of Ohm's Law.

The Laboratory note-books of candidates shall be examined and marked by examiners. Note-books which have not been signed at frequent intervals by the Professors under whom the candidates worked will not be accepted.

## CHEMISTRY -

### THEORETICAL COURSE

States of aggregation of matter, effect of pressure and temperature on volumes of gases, changes of state, saturation pressure, indestructibility of matter and of energy, chemical and physical changes, enumeration of changes attending chemical

reaction, elements and compounds, balance, weights and measures, common laboratory processes—mixture, solution, crystallisation, distillation, evaporation, precipitation, filtration, decantation, desiccation, combination by weight and volume, atoms and molecules, Avogadro's law, simple examples of determination of atomic weights, laws of chemical combination, the atom and atomic theory, general principles of periodic classification, terminology and nomenclature, symbols, formulæ, equations, decomposition, dissociation, combustion, oxidation, reduction, calculation of formulæ from percentage composition, calculations relating to weight and volume, Faraday's laws of electrolysis, electro-chemical equivalents, valency, acids, bases and salts, neutralisation.

Study of the following:—Hydrogen, oxygen, catalytic agent, ozone, allotropic modifications of elements, water, hydrogen-peroxide, nitrogen, air, ammonia, oxides of nitrogen, nitric acid, sulphur, polymorphs of elements, sulphuretted hydrogen, sulphur dioxide, sulphur trioxide, sulphuric acid, carbon, carbon monoxide, carbon dioxide, coal and its chief products, coal gas, marsh gas, ethylene, acetylene, structure of flame, fluorine, hydrofluoric acid, chlorine, hydrochloric acid, hypochlorous acid, bleaching powder, chlorates of potassium and calcium, bromine, hydrobromic acid, iodine, hydriodic acid, phosphorus, phosphuretted hydrogen, phosphorus trioxide, phosphorus pentoxide, orthophosphoric acid and orthophosphate, silicon, silica, dialysis, composition of glass, borax, sodium, potassium, calcium, magnesium, zinc, mercury, copper, silver, aluminium, lead, tin, iron—omitting metallurgical details—and their oxides, hydroxides, chlorides, nitrates, sulphates and carbonates.

### PRACTICAL COURSE

Fitting up of simple apparatus, *e.g.*, a wash-bottle.

Performance of experiments involving solution, filtration, distillation and crystallisation.

Determination of the water of crystallisation of hydrated salts.

Preparation and study of the principal properties of hydrogen and oxygen.

Performance of experiments illustrating the chemistry of fire, air and water.

Performance of experiments involving oxidation and reduction. Simple blow-pipe analysis.

Determination of the equivalent of zinc.

Preparation and study of the principal properties of sulphur dioxide, nitric acid, nitric oxide, ammonia, carbon dioxide, hydrochloric acid, chlorine and sulphuretted hydrogen.

Qualitative analysis of simple substances containing not more than one acid and one basic radical included in the following list:—ammonium, sodium, potassium, calcium, magnesium, zinc, mercury, copper, silver, aluminium, lead, tin, iron, and their oxides and hydroxides, chlorides, nitrates, sulphides, sulphates and carbonates.

Elementary Acidimetry and Alkalimetry.

Use of the chemical balance.

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## BOTANY

### *(Theoretical)*

(a) Elementary General Morphology, including a study of the outline of life-history of selected plants, to illustrate the gradual ascent in complexity of structure and reproductive cycle from the lowest algae and fungi to the phanerogams—to be studied with reference to the types to be prescribed from time to time.

(b) Elementary Histology: Structure and formation of cells, tissues and tissue systems. Structure of roots, stems and leaves; secondary growth.

(c) Elementary Plant Physiology: Absorption of water; movement of water and gases within the plants; chemistry of the plant-body; food materials of plants, their sources and form; photosynthesis; digestion; assimilation; transpiration; respiration; metabolism; reserve materials. Growth; influence of external conditions on growth. Irritability. Reproduction, sexual and asexual.

(d) The principles of Classification as illustrated by common plants; outlines of classification. Referring plants to their families.

(e) Elementary facts of Ecology.

### *(Practical)*

Use of the simple and compound microscopes. Dissection of flowers and floral parts. Referring plants to the families to be prescribed from time to time. Microscopic examination of the principal plant tissues. Microchemical reactions of cellulose and its modifications and the cell contents.

The course shall include the description and drawing of parts of plants and sections.



Demonstration of simple physiological experiments bearing on the theoretical portion by the teachers.

Candidates will be required to study the outlines of the life-history of the following:—

Oscillatoria, Spirogyra, Vaucheria, Oedogonium.

Yeast, Mucor, Agaricus.

Moss, Fern, Equisetum, Selaginella.

*Field work:* Examination of plants in the field with reference to the syllabus in Morphology and Classification.

*Types prescribed:—*

- (1) Gramineæ; Oryza; Zea; Cynodon.
- (2) Liliaceæ; Allium; Asparagus.
- (3) Nymphaeaceæ; Nymphaea and Nelumbium.
- (4) Capparidaceæ; Gynandropsis; Cleome.
- (5) Cruciferae; Brassica; Raphanus.
- (6) Leguminosæ; Pisum; Sesbania; Cassia; Caesalpinia; Mimosa; Acacia.
- (7) Euphorbiaceæ; Ricinus; Jatropha; Euphorbia.
- (8) Malvaceæ; Hibiscus; Gossypium.
- (9) Apocynaceæ; Vinca; Nerium.
- (10) Labiateæ; Ocimum; Leonurus.
- (11) Solanaceæ; Solanum; Datura.
- (12) Cucurbitaceæ; Cucurbita; Lagenaria.
- (13) Compositæ; Helianthus; Tridax.

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## PHYSIOLOGY

### DISTRIBUTION OF PAPERS

*Theoretical Paper I*—Characteristics of Life—Blood and its Circulation, Respiration, Kidney and Secretion of Urine, Skin.

*Theoretical Paper II*—Nervous System, Sense Organs, Endocrine Organs, Alimentation, Elementary Biochemistry—Nerve-Muscle Physiology.

*Practical Paper*—Histology and Elementary Biochemistry.

### (Theoretical)

#### 1. Introduction.

Characteristics of Living Matter—Amœba.

2. Structural Basis of Body.

Cell—its structure and functions.  
Tissues and Organs.  
General plan of the Human Body.

3. Biochemical Basis of Life.

Nitrogen and Carbon Cycle.  
Chemical composition of Living Matter—Elementary  
Chemistry of Proteins, Carbohydrates, and simple  
Lipides.

4. Alimentation—Nutrition—Dietetics.

The Alimentary Canal.  
Digestion in mouth, stomach and intestines.  
The composition and action of digestive juices.  
Liver and its functions.  
Absorption of digested foodstuffs from the alimentary  
canal—Fate of absorbed foodstuffs.  
Elementary knowledge of chemical composition of  
Foods.  
Nutrition of an individual—Normal diet.

5. Blood and its Circulation.

Blood—its general composition.  
Life history of red blood corpuscles and of white blood  
corpuscles—Coagulation of blood.  
The Circulatory System.  
Course of circulation—Proofs of circulation.  
Anatomy of Heart—Characteristics of cardiac muscle.  
Cardiac cycle—Action of valves—Heart sound—Ner-  
vous regulation of heart—Apex beat.  
Vascular System—Structure of arteries, capillaries  
and veins.  
Elementary principle of circulation—Arterial blood  
pressure—Pulse—Velocity of blood flow—Vaso-  
motor control.  
Lymph—Composition, formation and function of  
lymph.  
Spleen and its functions.

6. The Respiratory System.

The organs of Respiration.  
Mechanics of respiratory movements—Quantity of air  
breathed—Chemistry of respiration—Inspired air  
—Expired air—Alveolar air—External and inter-  
nal respiration—Regulation of breathing.  
Asphyxia and apnoea.  
Artificial respiration—Schafer's method.

7. Kidney.

Principal constituents of Urine.

Elementary knowledge of structure of Kidney and its circulation.

Formation of urine.

8. Skin and the Regulation of Temperature.

Skin—its structure and functions.

Regulation of body temperature.

9. Physiology of Movement.

Various kinds of joints and movements—Lever action.

Contraction of muscles.

Method of recording muscular contraction.

10. The Nervous System.

General view of the nervous system.

The Neurone.

Afferent and efferent nerves.

Spinal cord—its structure—Anterior and posterior roots—Functions of spinal cord—Reflex action

Cerebellum and Rolandic area of Cerebrum.

The Cranial nerves and their important functions.

11. The Sense Organs.

Cutaneous sensations.

Sensations of Smell and Taste.

Vision—Anatomy of the Eye—The optical system—Errors of refraction—Function of iris—Mechanism of accommodation.

Hearing—Anatomy of the Ear—Conduction of sound waves from air to internal ear.

12. The Endocrine Organs.

Elementary knowledge of structure and functions of Thyroid, Pituitary Body, Pancreas and Supra-renal.

(Practical)

HISTOLOGY

*The Microscope*—its use and care.

Examination of Milk, Unicellular organisms and Starch granules.

Examination of Frog's blood and of Human blood—Staining by irritation.

Preparation, staining and examination of Blood Film.

Preparation and examination of elementary tissues—Squamous, Columnar, Cubical and Ciliated epithelium, Muscles, Medullated nerve fibres.

Preparation of Areolar and Adipose tissues by spreading.  
Examination of Bones, Cartilage and Liver.

## BIOCHEMISTRY AND BIOPHYSICS

Simple tests and identification of Starch, Dextrin, Cane Sugar, Glucose, Lactose and Maltose, Proteins and Peptone. Emulsification and saponification of Fat.

Salivary digestion.

Examination of Milk, Flour and Egg.

Separation of albumin from globulin.

Demonstrations, such as Capillary circulation in frog's mesentery—Myographic recording of muscular contraction—Enumeration of Corpuscles of Blood and estimation of Hæmoglobin—Cutting of sections.

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## ZOOLOGY

### THEORETICAL COURSE

The scope of Zoology—Disinction between plant and animal. Broad sub-divisions of the animal kingdom. Outlines of the theory of Organic Evolution. The general morphology and physiology of the cell; cell division. Simple tissues.

The general characters of the Protozoa:—types—Amoeba, Paramecium.

The general characters of the Coelenterata:—type—Hydra.

The general characters of the Annelida:—type—Earthworm.

The general characters of the Arthropoda:—types—Prawn, Cockroach (gross anatomy).

The general characters of the Mollusca:—type—Fresh-water mussel (gross anatomy).

The general characters of the Chordata and broad sub-divisions into classes.

The general anatomy of the soft parts of a common Teleost.

Structural details of Frog or Toad and outline of life-history of the common Frog.

General characters of the Mammalia:—type—Guinea-pig or Rabbit (gross anatomy).

The morphology of the types mentioned should be treated in an elementary way except in the case of Frog or Toad.

## PRACTICAL COURSE

The use of compound microscope.

A general acquaintance with histology of simple animal tissues.

Microscopic examination of:—Amoeba, Paramoecium and Hydra, sections of Earthworm (*Pheretima*) and of the organs of Frog or Toad.

Microscopic examination of the types mentioned in the theoretical course.

Dissection of digestive and nervous system of:—Earthworm, Prawn, common Teleost and Frog or Toad.

Dissection of the circulatory and reproductive systems of the Prawn, common Teleost and Frog or Toad.

General examination of the viscera of the Guinea-pig and dissection of its vascular system.

Distribution of theoretical papers will be as follows:—

First paper ... Invertebrata.

Second paper ... General and Vertebrata.

The Laboratory note-books of candidates shall be examined and marked by examiners. Note-books which have not been signed at frequent intervals by the Professors under whom the candidates worked will not be accepted.

## GEOLOGY

## THEORETICAL COURSE

Candidates are required to possess an elementary knowledge of the following:—

The object of Geology and also of its various branches.

The earth as a planet; its origin; the nature of its atmosphere, crust and interior.

Physical characters of the continental plateaux and oceanic depressions.

Effects of temperature changes on rocks. The geological work of air, water, ice and life. Crustal movements and deformations; common structural features. Types of mountains. Nature and origin of earthquakes and volcanoes; their distribution and effects. Volcanic products. Hot springs and geysers.

Elements of crystallography. The principal physical characters and chemical composition of the minerals in the following list:—

Diamond, graphite, sulphur, gold, galena, sphalerite, cinnabar, chalcopyrite, pyrite, halite, fluorite, quartz, opal, corundum, haematite, spinel, magnetite, pyrolusite, psilomelane,

braunite, bauxite, calcite, dolomite, the feldspar, augite, hornblende, garnet, olivine, tourmaline, muscovite, biotite, talc, kaclinite, apatite, barite, gypsum.

Distinction between igneous, sedimentary and metamorphic rocks. Modes of occurrence of igneous rocks. A simple classification of igneous rocks.

Formation and consolidation of different types of sediments. False bedding, overlap and unconformity.

The factors and kinds of metamorphism.

Description of rocks in the following list:—Granite, syenite, diorite, gabbro, peridotite, rhyolite, trachyte, andesite, dolerite, basalt, pegmatite, tuffs and ashes, shale, sandstone, conglomerate, limestone, peat, lignite, coal, tufa, sinter, gneiss, schist, slate, marble, quartzite and laterite.

The more common uses, if any, of the minerals and rocks in the above lists.

Preservation of plant and animal remains as fossils and their value in historical geology. Sub-divisions of geological time. Standard stratigraphical scale. Leading palaeontological features of Palaeozoic, Mesozoic and Cainozoic eras.

Physical features of India. Elementary knowledge of the chief stratigraphical units of India such as Archæan, Purana, Dravidian and Aryan eras.

## PRACTICAL COURSE

Determination of hardness and specific gravity of mineral specimens. Recognition in hand specimens of minerals and rocks mentioned in the above lists. Observation of general geological features in the field. Determination of dip and strike. Interpretation of simple geological maps and drawing of sections.

Recognition of the following rock-forming minerals in thin sections under the microscope—Quartz, orthoclase, plagioclase, muscovite, biotite, augite, hornblende, garnet, olivine and tourmaline. Determination of symmetry in models of simple crystals.

Recognition of the following genera of fossils:—Gangamopteris, Glossopteris, Nummulites, Zaphrentis, Calceola, Monograptus, Cidaris, Micraster, Productus, Spirifer, Arca, Cardita, Hippurites, Ostrea, Bellerophon, Turritella, Physa, Orthoceras, Nautilus, Ceratites, Belemnites, Paradoxides, Calymene, Agnostus.

Laboratory and field note-books shall be inspected and marked by the examiners, and if they are found to be unsatisfactory, the candidate will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidate worked will not be accepted.

The list of minerals, rocks and fossils in this syllabus may be modified by the Syndicate on the recommendation of the Board of Studies in Geology and Mineralogy.

## GEOGRAPHY

### THEORETICAL COURSE

#### *Paper I*—Human, Economic and Regional Geography—

Modes of life in typical areas: environmental influences on group life; man as a geographical factor; general distribution of population; general conditions of life; means of sustenance in typical areas; distribution of occupation; human dwellings; village types; classification of towns.

Natural regions of the world on the basis of relief, climate and vegetation. The outlines of the geography of the continents: political divisions; surface relief: river systems; climatic and weather conditions; vegetation and animal life; general conditions of agricultural, industrial and commercial life; towns. (Causal relations amongst the foregoing points relating to each continent should be brought out as far as practicable.)

The influence of climate, relief and soil conditions on the economic activities—agriculture, commerce and industry; rice and wheat, their distributions; other cereals; oil seeds; fruit trees; the sugar-cane; jute; tea, coffee and cocoa; potatoes and vegetables; dairy produce; forest products; important fisheries of the world; exploitation of minerals; means of transport.

India: A general study of India with a fuller treatment of either Bengal or Assam in the light of the foregoing principles of Geography.

#### *Paper II*—The Physical Basis of Geography—

The movements of the earth and the resulting diurnal and seasonal changes.

Distribution of land and water; relief of the land and of the ocean floor; the crust of the earth—types of minerals, rocks and soils; study of typical areas to illustrate the combined influences of erosion, faulting and folding and igneous intrusion.

The atmosphere; distributions of temperature, pressure, winds and rainfall with reference to climatic regions.

Types of oceans, seas and lakes, movements of oceans.

Differentiation in the earth's vegetation due to climatic factors; edaphic formations.

General characters of different types of animals.

## PRACTICAL COURSE

Simple meteorological observations; Maximum and minimum thermometer; dry and wet bulb thermometer; barometer; rain gauge. Plotting of meteorological data.

Map Projection—Drawing of maps on cylindrical equal area projection; comparative study of maps drawn on simple projections.

Conventional signs used in survey maps; Interpretation of topographical maps: small scale (1/M) and large scale (1") maps of typical areas of India.

Drawing and interpretation of climatological and economic maps.

Surveying: Simple methods of surveys including the use of the chain.

## BIOLOGY

## THEORETICAL COURSE

(1) Characteristic of the living matter Difference between living and non-living. Difference between animal and plant.

(2) The physical and chemical nature of protoplasm (treated in an elementary manner. Cells, animal and vegetable, their structures and functions. Cell division. Tissues and tissue-systems in animals and plants.

(3) Nutrition and growth, circulation of nutritive materials, respiration, excretion, secretion and the storage of reserve material in animals and plants Photosynthesis in plants.

(4) Stimulus and response in plants and animals. Movements in plants and animals. Nervous mechanism in animals.

(5) Chemical co-ordination.

(6) Reproduction, asexual and sexual. Parthenogenesis. Alternation of generations. The formation of the embryo in the fowl.

(7) Outlines of the theory of organic evolution

(8) Elementary study of the following types—

Amœba—Monocystis—Hydra—Leech—the freshwater prawn (Palæmon)—Bhekti—Toad—Guinea-pig.

Yeast—Mucor—Spirogyra—Moss—Fern—Pea plant—Maize plant.

## PRACTICAL COURSE

Candidates shall be required to dissect and examine microscopically the above types. They must be prepared to examine and describe the parts of various flowering plants in simple technical terms.



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## ANTHROPOLOGY

### THEORETICAL COURSE

#### *Paper I*

Outlines of Physical Anthropology and Pre-history.  
 Man's place amongst the mammals.  
 An elementary knowledge of the human skeleton.  
 Definition of a fossil. Definition of geological strata. Main sub-divisions of geological time.  
 Main stages in Pre-history—Palæolithic and Neolithic.  
 General outline of the early types of man.  
 Geographical distribution of the human races. Principal racial types and chief linguistic families in India.

#### *Paper II*

#### *Outlines of Social Anthropology*

Development of social organisation—family, clan, marriage.  
 Economic pursuits of primitive hunters, fishers, herdsmen and agriculturists and the main traits of their material culture.  
 Outlines of beliefs in ghosts, spirits, supreme and superior beings.  
 Magic and Fetishism.

### PRACTICAL COURSE

Identification of important cranial points and principal bones of the human body. Identification of photos and specimens illustrative of the life of primitive peoples of India.

Elementary anthropometry, stature, head length, head breadth; cephalic index, nasal length, nasal breadth, nasal index.  
 Observations of hair and skin colour.

(Special reference is to be made wherever possible to India in general and Bengal in particular.)

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## PSYCHOLOGY

The Course shall consist of the following parts:

### A. Theoretical—

- |                                    |                      |
|------------------------------------|----------------------|
| 1. General Psychology              | <i>First Paper.</i>  |
| 2. Genetic and Abnormal Psychology | <i>Second Paper.</i> |

### B. Practical.

### THEORETICAL COURSE

#### *Paper I*

#### *General Psychology*

1. Definition of Psychology, Relation of Psychology to other Sciences.

2. General idea of the nervous system. Relation of Body and Mind. Interactionism and Psycho-physical parallelism.

3. Methods of Psychology: Observation, Introspection, Experimental and Genetic methods.

4. Problems and Scope: General, Animal, Child, Abnormal, Educational, Vocational and Industrial Psychology.

5. Mental Elements: Sensation, Image, Affection.

6. Sensations: General facts regarding visual, auditory, olfactory, gustatory, cutaneous, kinæsthetic and organic sensations. General knowledge of the sense organs.

7. Intensity: Weber's Law.

8. Image: Sensation and Image. Image-types, Synaesthesia.

9. Affection: Pleasantness, Unpleasantness. Experimental Investigation.

10. Attention: Level, Range, Duration.

11. Perception: Sensation and Perception. General facts regarding spatial and temporal perceptions and perception of movement. Illusions and Hallucinations.

12. Memory: Memory image. Association: Conditions of association. Forgetting and improvement of memory.

13. Learning: Types of learning. Learning and habit. Laws of Memory and Learning.

14. Imagination: Memory and Imagination. Image of imagination. Forms of imagination.

15. Thought: Relation of Thought to Memory, Imagination, etc. Nature of Thought. Belief. Thought and Language.

16. Action: Reflex, Instinctive, Voluntary and other forms of action. Reaction time.

17. Emotion: Emotion and Instinct; their rôle in life. Feeling and Emotion, Organic changes in Emotion, specially in anger and fear.

18. Intelligence: Nature of Intelligence. A general idea of Binet-Simon tests. I. Q.

19. Idea of Self. Unity of Mental life.

## *Paper II*

### *Genetic and Abnormal Psychology*

#### A. Genetic Psychology—

1. Definition. Scope. Methods.
2. Beginnings of life. Characters of living organisms.
3. Characteristic behaviours of amœba, paramecium, earth-worm, hydra, starfish, bees, birds, dogs and apes.
4. Nervous organisation and its relation to consciousness: Criteria of consciousness.
5. General idea of evolution of bodily structure and mind.
6. Instinctive and intelligent activities.
7. The child: (a) Original equipments and capacities of the child. Sense organs, and organs of response. Reflexes. Instincts and emotions in children.  
(b) Perception of colour, form, number, distance and time.  
(c) Imitation, curiosity, play and love.
8. Learning of children and apes.

#### B. Abnormal Psychology—

1. Normal and abnormal mind. Signs of mental disorder.
2. Mental deficiency. Grades. Paretical problems.
3. Somnambulism. Multiple personality. Hypnotism.
4. Repression. Conflict and modes of resolution of conflict.
5. Errors. Day dreams. Dreams.
6. Description of anxiety, neurosis, obsessional psycho-neurosis and paranoia.
7. Mental adjustment.

### PRACTICAL COURSE

1. Vision: Determination of the near and far points.  
Double vision.  
Stereoscopic vision.

After images: Positive and Negative.

Colour contrast.

Laws of colour mixture.

Demonstration of the blind-spot. Campimeter.

Demonstration of retinal sensitivity for colours.

2. Cutaneous sensations: Determination of touch spots, temperature spots and pain spots.

3. Determination of the aesthesiometric index.

4. Illusion: Muller-Lyer illusion, Aristotle's experiment. Size-weight illusion.

5. Feeling: Method of impression—colour preference. Method of expression—pneumograph.

6. Determination of the reaction time: Group method. Vernier.

7. Determination of image type.

8. Memory span with nonsense syllables. Memorisation by learning method.

9. Word association experiment.

*N.B.—Students must be trained in introspection.*

The Laboratory note-books of candidates shall be examined and marked by examiners. Note-books which have not been signed at frequent intervals by the Professors under whom the candidates worked will not be accepted.

## GENERAL

1. In order to pass the Intermediate Examination in Science a candidate must obtain—

In English	...	108 marks.
In the Vernacular or the Alternative paper	...	36 marks.
In Mathematics	...	60 marks.

In each of the remaining compulsory subjects—

In the two theoretical papers	...	40 marks.
In the practical paper	...	20 marks.

And in the aggregate of the compulsory subjects ... 340 marks.

2. In order to be placed in the first division a candidate must obtain 500 marks.

In order to be placed in the second division 400 marks.

If a candidate has passed in the compulsory subjects and in the aggregate, the marks in excess of 60 obtained by him in the optional subject, if any, shall be added to his aggregate, and the aggregate so obtained shall determine his division and his place in the list:

Provided that in any Science subject such marks shall not be added unless the candidate has obtained at least 40 marks in the theoretical papers and 20 marks in the practical paper.

3. Any candidate, who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

4. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

5. Candidates, who, after passing the Intermediate Examination in Arts, appear for the Intermediate Examination in Science, shall be required, in order to pass, to obtain 36 per cent. in each subject for which they present themselves in the latter examination :

Provided that in a Science subject they must obtain pass marks both in the theoretical papers and in the practical paper.

## CHAPTER XXXVI

### BACHELOR OF SCIENCE

1. An examination for the Degree of Bachelor of Science shall be held annually in Calcutta, and such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any undergraduate of the University may be admitted to the examination provided he has prosecuted a regular course of study for not less than two academical years after passing the Intermediate Examination in Science, in one or more Colleges affiliated to the University in the subjects which the candidate takes up

3. Every candidate sent up for the B.Sc. Examination by an affiliated College shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests, and (d) of probability of passing the examination. Every candidate shall send in his application, with a certificate in the form prescribed by the Syndicate, to the Registrar at least six weeks before the date fixed for the commencement of the examination. If he desires to be examined for Honours in any subject he shall name the subject in his application. If a candidate offers Psychology he shall be required to give the Registrar notice of the fact twelve months before the date of the examination.

4. A fee of Rs. 45 shall be forwarded by each candidate with his application, provided that a candidate who applies for admission to the Honours Examination shall pay an additional fee of Rs. 10.

A candidate who fails to pass or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to one or more subsequent examinations for the Degree of Bachelor of Science on payment of a like fee of Rs. 45 or 55 as the case may be on each occasion, subject to the provisions of Sections 4B and 4C:

Provided that if a candidate who has passed the B.Sc. Examination and is prosecuting his studies for a higher examination or other examination in a College affiliated to this University or in the University-Post-Graduate Classes, is required by the Uni-

versity to appear in a special subject at the B.Sc. Examination, he shall pay a reduced fee of Rs. 23 for the Pass Course and Rs. 28 for the Honours Course, as the case may be.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied, or from a member of the Senate, testifying to his good character during the intervening period, and provided further that in case the student offers a Science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other affiliated college or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If such student does not register himself as a candidate for, or appear at, any of the two examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, on payment of the prescribed fee, provided that he produces a certificate testifying to his good character during the intervening period as above, and provided further that he prosecutes a fresh course of study for at least one academical year immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing at the examination under the second paragraph of this section will be deemed to be non-collegiate students.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who, having been allowed to appear at the examination as a non-collegiate student on account of shortage of attendance at lectures,

does not register himself as a candidate for or present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

4B. If a student appears at the examination and fails, he may appear at any of the two following examinations of the same standard, on payment of the prescribed fee, provided that he produces, in addition to ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the college at which he last studied or, with the permission of the Syndicate, from the Principal of any other college affiliated to the University, that he has passed the test examination held by such a college immediately preceding the examination to which he seeks admission and a certificate either from the Principal of such a college or from a member of the Senate testifying to his good character during the intervening period: Provided further that in case a student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate, from the Principal of the said college or of any other college or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training during the year immediately preceding the examination at which he presents himself: Provided also that no student who has been unsuccessful at the examination in an Honours subject will be allowed to take up Honours course unless he prosecutes a regular course of study for one academical year immediately preceding his admission to the examination in the Honours subject.

Second, third and fourth paragraphs of Section 4A above should apply to students referred to in the above paragraph.

4C. If a candidate is unsuccessful at the examination on account of failure to secure pass marks in one subject only but obtains 40 per cent. of marks in aggregate in other subjects, he may appear for re-examination in that subject alone in which he has failed, on payment of a fee of Rs. 23, at a special supplementary examination, if held by the University, six months after the examination at which he was unsuccessful, or at the next annual examination, but not at both:

Provided that the candidate produces, in addition to the ordinary certificate or certificates required by the Regulations, a certificate from the Principal of the college at which he last studied or from a member of the Senate, testifying to his good character during the intervening period:

Provided further that, in case a student appears for re-examination in a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Principal of the said college or of any other



college affiliated to the University in that subject or from some other authority approved by the Syndicate, to the effect that he has taken a course of practical training in that subject for a period of not less than three months preceding the examination at which he presents himself:

Provided also that no student, who has been unsuccessful at the examination in an Honours subject, shall be allowed to appear for re-examination in the Honours Course in that subject.

If the candidate obtains pass marks in the subject at the re-examination, he shall be declared to have passed the examination as a whole.

If such a candidate fails to pass in the subject at the re-examination or fails to appear at any of the examinations mentioned in the first paragraph and seeks admission to any subsequent annual examination of the University, he will be required to appear in all the subjects prescribed for the examination, subject to the provisions of Section 4B above.

5. The examination for the Degree of Bachelor of Science shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. Every candidate shall be examined in three of the following subjects selected by himself:—

- (I) Mathematics.
- (II) Physics.
- (III) Chemistry.
- (IV) Botany.
- (V) Geology.
- (VI) Zoology.
- (VII) Physiology.
- (VIII) Psychology.
- (IX) Anthropology.
- (X) Geography.
- (XI) Statistics.

7. No student shall be permitted to take up Mathematics or Geography for the B.Sc. Examination unless he has taken it up for his Intermediate Examination.

No student shall be permitted to take up Physics or Chemistry for the B.Sc. Examination unless he has taken up both Mathematics and Physics for the Intermediate Examination. No student shall be permitted to take up Psychology for the B.Sc. Examination unless he has taken up any one of the following subjects in the Intermediate Examination:—Psychology, Physiology, Biology or Physics.

No student shall be permitted to take up Botany for the B.Sc. Examination unless he has taken up Botany or Biology for the Intermediate Examination.

No student shall be permitted to take up Statistics for the B.Sc. Examination if he has not taken up Mathematics for the Intermediate Examination.

8. A candidate may take up the Pass Course in three subjects, or the Pass Course in two subjects and the Honours Course in one subject. In the Pass Course, in any subject except Mathematics, there shall be two theoretical papers and one paper in practical work. In the Honours Examination in any subject except Mathematics there shall be four theoretical and two practical papers. In Pass Mathematics, there shall be three theoretical papers. In Honours Mathematics, there shall be six theoretical papers and no practical papers; but every student who desires to be examined in Honours Mathematics must produce a certificate from the Principal of his college to the effect that he has completed in an affiliated college the corresponding practical course in Astronomy prescribed by the Regulations.

9. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed in the Pass Course, arranged in alphabetical order together with a list of those who have obtained Honours in each branch, arranged in two classes, both in order of merit. Names of candidates who pass the examination under Section 4C above shall be published separately, arranged in alphabetical order, without any class or distinction. Each successful candidate shall receive with his Degree of B.Sc. a certificate in the form entered in Appendix A.

10. The limits of the above subjects for both theoretical and practical work are defined below:

## MATHEMATICS

The papers in Mathematics shall be distributed as follows:—

### PASS COURSE

#### *Paper I*

#### 1. *Higher Plane Trigonometry.*

Submultiple angles.

Properties of triangles.

Inverse circular functions.

Summation of finite series and infinite series; elementary notion of the convergence of series as applied to the exponential series, the logarithmic series and the sine series.

De Moivre's theorem.

Exponential values of sine and cosine.

Expansion of sine  $\theta$  and cos  $\theta$  in powers of  $\theta$ .

## 2. *Plane Analytical Geometry.*

Co-ordinates, Cartesian and polar.

Transformation of Co-ordinates; changes of axes.

The straight line; equations representing a pair of straight lines.

The circle.

The parabola.

The ellipse.

The hyperbola.

## *Paper II*

## 3. *Differential Calculus.*

Variables and constants.

Functions; the graph of a function.

Limits; continuity; discontinuity; differentiation; infinitesimals; differentials; successive differentiation; use of Taylor's and Maclaurin's theorems; Lagrange's form of the remainder after  $n$  terms in Taylor's expansion.

Maxima and minima.

Differentiation of a function of several variables; partial differentiation.

Simple Geometrical and Physical applications.

## 4. *Integral Calculus and Differential Equations.*

Integration, Integral considered as the limit of a sum.

Elementary integrals.

Integration by parts.

Integration with the help of partial fractions.

Integration of irrational and trigonometrical fractions.

Differential equations of the first order involving two variables.

Linear differential equations with constant coefficients.

Simple Geometrical and Physical applications.

## *Paper III*

## 5. *Hydrostatics.*

Nature and properties of fluid pressure.

Equilibrium of liquids; determination of the pressure of a heavy liquid in equilibrium in simple cases.

Centre of pressure.

Density and specific gravity; determination of specific gravities.

Conditions of equilibrium of a floating body and geometrical discussion of the stability.

Properties of elastic fluids and determination of pressure.

Measurement of heights by the barometer.

Descriptions of the barometer, air-pump, common and force pumps, the diving bell, the balloon, siphon and Brahmah's press as applications of hydrostatical principles.

*N.B.*—Candidates will be expected to apply Differential Calculus and Integral Calculus to the solution of simple Hydrostatic problems.

#### 6. *Astronomy.*

The subject is to be treated mathematically but without the use of spherical trigonometry.

The earth.

Astronomical Co-ordinates.

Astronomical clock, transit instrument, meridian circle and equatorial.

Atmospheric refraction.

The sun and the solar system.

Parallax.

Determination of the first point of Aries.

Precession, nutation, aberration.

The moon.

Lunar and solar eclipses.

Measurement of time.

Determination of latitude and longitude by simple methods.

The fixed stars.

### HONOURS COURSE

#### *Paper I*

##### 1. *Higher Algebra.*

Inequalities.

Convergence and divergence of series.

Binomial theorem.

Simple continued fractions.

Summation of series.

Determinants.

##### 2. *Elementary Theory of Equations.*

General properties of Equations.

Relation between roots and co-efficients of equations.

Transformation of equations.  
 Algebraic solution of cubic and biquadratic equations.  
 Limits of the roots of equations.  
 Solution of numerical equations.

### *Paper II*

#### 3. *Higher Plane Trigonometry.*

In addition to a fuller treatment of the Pass Course, the following:—

Expansion of  $\sin^n \theta$ ,  $\cos^n \theta$ ,  $\sin n\theta$ ,  $\cos n\theta$ ; hyperbolic functions.

Expansions in series.

Resolution of circular and hyperbolic functions into factors.

#### 4. *Plane Analytical Geometry.*

In addition to a fuller treatment of the Pass Course, the general equation of the second degree in Cartesian Co-ordinates.

### *Paper III*

#### 5. *Elementary Solid Geometry.*

Cartesian and Polar Co-ordinates.

The straight line and plane.

The sphere.

The cone and cylinder.

The ellipsoid.

The hyperboloids.

The paraboloids.

Generating lines and sections of quadrics, conjugate diameters.

Diametral planes and the principal planes.

General equation of the second degree in Cartesian Co-ordinates.

Curvature of surfaces; Meunier's theorem.

#### 6. *Elementary Principles of Vectors.*

Fundamental notions.

Addition, subtraction and multiplication of vectors.

Elementary notion of quaternions.

Simple geometrical and physical applications.

### *Paper IV*

#### 7. *Differential Calculus.*

In addition to a fuller treatment of the Pass Course, an increased number of geometrical, physical and

analytical applications; also a more rigorous knowledge of the fundamental notions, limits, continuity, discontinuity, differential co-efficient.

### 8. *Integral Calculus.*

In addition to a fuller treatment of the Pass Course:—

Formulae of reduction.

Simple cases of definite integrals.

Fourier's Series.

Differential equations of the first and second orders.  
involving two variables only.

### *Paper V*

### 9. *Statics.*

Composition and Resolution of forces.

General conditions of equilibrium of a particle under the action of co-planar forces.

Equilibrium of a particle on plane curves.

Composition and resolution of co-planar forces acting on a rigid body.

Principle of virtual work.

Simple machines.

Friction.

Centroids and centres of mass.

Simple cases of equilibrium of flexible, inextensible strings.

### 10. *Dynamics of a Particle.*

Velocity, acceleration.

Loss of motion.

Rectilinear, parabolic, circular and harmonic motion.

Plane constrained motions.

Impact.

Work and energy.

Central Orbits.

### *Paper VI*

### 11. *Hydrostatics.*

In addition to a fuller treatment of the Pass Course:—

Analytical discussion of the stability of the equilibrium of a floating body in simple cases.

### 12. *Astronomy.*

#### *Theoretical*

The subject of the Pass Course treated more fully.

*N.B.*—Candidates will be expected to possess an elementary knowledge of Spherical Trigonometry and to apply it to the discussion of simple problems in Astronomy.

*Practical*

The students should be required to make observations with a view to—

- (1) the determination of Latitude;
- (2) the determination of Time;
- (3) the determination of Longitude;
- (4) the determination of Azimuth;
- (5) the use of methods suitable at Sea; and
- (6) the plotting of the apparent path of one planet among the stars.

## PHYSICS

## PASS COURSE

*Theoretical*

The subjects are to be treated mathematically as well as experimentally as far as the Mathematics of the Intermediate course are applicable.

In addition to a fuller treatment of the parts of the subject prescribed for the Intermediate Examination in Science the following:—

*General Ideas*1. *Wave Motions.*

Simple harmonic motion—Combination of S. H. Motions.  
Graphical composition of simple harmonic motions.

2. *Potential.*

Definition of Potential.  
Calculation of Potential in simple cases.

3. *General Properties of Matter.*

Gravitation and Gravitation constant.  
Moment of Inertia for simple cases.  
Deformation of Solids.  
Elasticity, Young's modulus, Poisson's ratio, Simple rigidity—treated experimentally.  
Friction.  
Experimental study of—

Surface Tension and Capillarity.  
Viscosity.  
Diffusion and Osmosis.  
Rotary Pumps.

4. *Units and Dimensions.*

*Heat*

Measurement of high and low temperatures.  
Calorimetry and change of state.  
Dulong and Petit's Law.  
Vapour Density and Vapour Pressure.  
Critical State, Andrew's and Amagat's experiments.  
Conductivity of solids. Diffusivity—Measurement.  
First laws of Thermodynamics.  
Determination of J.  
Conversion of heat into work.  
Isothermal and adiabatic changes.  
Specific heats under various conditions.  
Heat engines.  
Liquefaction of gases.  
Nature of Radiation.  
Elementary ideas on Kinetic Theory of Gases.

*Light*

Velocity of Light—Fizeau's and Foucault's methods.  
Explanation of reflection and refraction from Huyghens' principle.  
Caustic curves.  
Magnification of Microscopes and Telescopes.  
Sextant, Prism Binocular, Stereoscope and Periscope.  
Dispersive power.  
Achromatic combinations.  
Direct-vision spectroscope.  
Spectrometer.  
Infra-red, visible and ultra-violet spectra.  
Rainbow (primary).  
Significance of the spectra of celestial bodies.  
Doppler effect.  
Simple cases of Interference and Diffraction.  
Diffraction grating.  
Polarisation.  
Double refraction.  
Nicol's prism.

*Sound*

Velocity of Sound in air with Laplace's correction.  
Doppler's principle.  
Simple cases of interference of sound; Beats.  
Stationary waves. Forced and free vibrations. Resonance.  
Diatonic scale. Temperament.  
Quality of sound. Combinational tones.  
Human voice.



*Electricity and Magnetism**(a) Magnetism.*

Explanation of reflection and refraction from Huyghens' magnetic field.

Magnetic potential.

Magnetic properties of iron and steel. Susceptibility and Permeability.

Hysteresis.

Paramagnetism, Ferromagnetism and Diamagnetism.

*(b) Frictional Electricity.*

Field of Force.

Gauss's Theorem.

Electrostatic energy.

Electric condensers of simple geometric form.

Specific inductive capacity and its measurement in case of solids

Electrometers.

Electrostatic units.

*(c) Dynamical Electricity.*

Kirchoff's laws.

Mechanical interaction of currents and magnets.

Measurement of Electromotive force. Conductivity and resistance and current.

Electromagnetic units.

Effect of temperature on electric resistance.

Platinum thermometer.

Effect of light and magnetic field on resistance—Selenium cell.

Theory of secondary cells.

Joule's Law—Electrical Energy—Power, Efficiency.

Town and house supply of electrical energy—commercial meters.

Thermo-electricity including Peltier and Thomson effects.

Thermo-galvanometers and Electric Pyrometers.

Laws of electromagnetic induction: co-efficients of self and mutual induction.

Earth Inductor: Simple alternating currents and general principles of transformers.

Simple Dynamos and Motors.

Elementary knowledge of—

(1) Electric oscillations and electric waves.

(2) Measurement of charge and mass of electron.

(3) Thermionic tubes.

Production and nature of X-rays,  $\alpha$ -rays,  $\beta$ -rays and  $\gamma$ -rays,

*Practical*

Use of the balance.

Reading and correcting Barometer.

Determination of Specific Gravities.

Determination of the modulus of elasticity of a given wire by stretching.

Determination of the intensity of gravity by the pendulum.

Measurement of the co-efficient of linear expansion of metals.

Measurement of the co-efficient of apparent expansion of a liquid.

Measurement of the co-efficient of expansion of air at constant pressure.

Measurement of the co-efficient of increase of pressure of a gas at constant volume.

Determination of the specific heat of solids and liquids with radiation correction.

Determination of the hygrometric state.

Determination of the velocity of sound by resonance columns.

Use of the Sonometer.

Determination of focal lengths of Lenses and Mirrors.

Verification of the formula for focal length of the combination of lenses.

Determination of the magnifying power of the combination of lenses.

Refractive index of a liquid by Microscope.

Adjustment and use of Spectroscope.

Spectrometer determination of the refractive index of the substance of the prism.

$\mu$  by total reflection.

Comparison of magnetic moments.

Determination of horizontal intensity of Earth's magnetism.

Use of Voltmeters and Ammeters. Millivoltmeters and Milliammeters.

Constant of a Tangent Galvanometer by copper voltmeter.

Figure of merit of a Galvanometer.

Measurement of the resistance of wires.

Comparison of electromotive forces.

Measurement of Low and High Resistances.

Measurement of Galvanometer Resistance.

Laboratory arts such as glass blowing and soldering.

The Laboratory note-books of the candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books, which have not been signed at frequent intervals by the Professors under whom the candidates worked, will not be accepted.

## HONOURS COURSE

*Theoretical*

The subject for the Pass Course treated fully with the addition of the following, the whole being treated theoretically as well as experimentally:—

*General Properties—*

Experimental determination of Gravitational constant.  
Theory of Dimensions.  
Young's modulus due to bending. Torsional rigidity.  
Relation between elastic constants.  
Viscosity of liquids and gases—experimental determination.  
Production of High Vacuum. McLeod gauge.  
Brownian movement.

*Heat—*

Equations of states—Theory of corresponding states.  
Black body radiation—Stefan and Boltzman's Law.  
Empirical Radiation Formula.  
Radiation Pyrometry.  
First and second laws of Thermodynamics; Carnot's cycle  
Entropy.  
Absolute scale of temperature.  
Kinetic theory of gases and simple applications.  
Specific Heat at low temperature.

*Light—*

Modern methods of determination of velocity of light.  
Thick lens: Field of view.  
Compound eye-pieces.  
Interference—Newton's rings.  
Michelson's Interferometer.  
Simple cases of Diffraction  
Resolving power of Prism and Grating.  
Anomalous Dispersion.  
Polarised Light and its interference—interference pattern in crystals.  
Circular and Elliptic polarisation: Rotatory polarisation.  
Faraday Effect. Kerr Effect.  
Spectrum and its teaching; Hydrogen spectrum—Balmer's series.  
Normal Zeeman Effect.

*Sound—*

Absolute determination of frequency of tuning fork.  
Stationary waves, forced oscillations.  
Energy of sound waves.  
Determination of intensity of sound.

*Electricity and Magnetism—*

- (a) Magnetic force due to a small magnet
  - Energy of a magnetic field.
  - Magnetic shells.
  - Magnetic lines of force—Intensity of magnetisation and magnetic induction.
  - Permeability and Susceptibility.
  - Hysteresis—energy loss.
- (b) Laplace and Poisson's Equations.
  - \* Polarisation in Dielectrics.
  - Simple cases of electric images.
  - Theory of Quadrant Electrometer.
- (c) Theory and use of Ballistic Galvanometer.
  - Absolute measurement of resistance and current.
  - Alternating currents and Transformer.
  - Oscillatory Discharge of a Condenser—Hertz Experiment.
  - Ratio of Electrostatic to Electromagnetic Units.
  - Positive Rays: Isotopes.
  - Ionisation and Saturation current.
  - C. T. R. Wilson's Experiment.
  - Measurement of wave-lengths of X-rays.
  - Einstein's Photo-electric equation.
  - Significance of atomic number.

*Practical*

In addition to the Pass Course, the following:—

- Use of the balance with corrections for displacement of air.
- Calibration of tubes.
- Determination of Young's modulus of a given rod by bending.
- Measurements of surface tension by means of capillary tubes.
- Variation of density of water with temperature.
- Expansion of water on solidification.
- Specific heat of liquids by the method of cooling.
- Determination of vapour pressure.
- Determination of vapour density.
- Clement's and Desorme's method of finding out the ratio of two specific heats.
- Conductivity of a bar by Searle's method.
- Velocity of sound in rods by Kundt's tube.
- Refractive indices of solids and liquids.
- Determination of focal points of combination of lenses.
- Mapping of Spectra.
- Diffraction through single and double slits.

Measurement of wave-lengths by gratings.

Bi-prism.

Measurement of battery resistance.

Platinum resistance thermometer.

Measurement of electrolytic resistance.

Determination of J. by Callendar and Barnes apparatus.

Determination of Thermo E. M. F. of a thermo-couple.

Greater proficiency is expected in glass-blowing than in the Pass Course.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books, which have not been signed at frequent intervals by the Professors under whom the candidates worked, will not be accepted.

## CHEMISTRY

### PASS COURSE

In addition to a fuller treatment of the subjects prescribed for the I.A. and I.Sc. course, the following:—

#### *Theoretical*

Periodic classification of elements, atomic number, isotopes. kinetic theory of gases, diffusion of gases, liquefaction of gases, laws of mass action, catalysis, osmotic pressure, the theory of solution, colloids, elements of thermo-chemistry, methods of determination of equivalent, atomic and molecular weights, basicity of acids, acidity of bases, allotropy, isomerism, polymerism, compound radicals and homology, velocity of chemical action, chemical equilibrium, theory of electrolytic dissociation.

Preparation and properties of the following elements and their chief compounds—oxygen, hydrogen, nitrogen, argon, fluorine, chlorine, bromine, iodine, sulphur, boron, carbon, silicon, phosphorus, arsenic, lithium, sodium, potassium, ammonium, calcium, strontium, barium, magnesium, zinc, cadmium, mercury, copper, silver, gold, aluminium, manganese, iron, tin, lead, antimony, bismuth, nickel, cobalt, chromium and the following compounds of carbon:—

Methane, ethane, ethylene, acetylene, their simple derivatives—namely, haloid derivatives, aldehydes, ketones, alcohols, monobasic acids, acid chlorides, acid anhydrides, acid amides, nitrites, ethers, esters, primary, secondary and tertiary amines, glycol, lactic acid, oxalic acid, malonic acid and succinic acid, tartaric acid, glycerol, citric acid, fats, soaps and candles (hy-

drololysis, saponification), dextrose, laevulose, cane sugar, starch, cellulose; cyanogen, hydrocyanic acid, ferro-and ferricyanides; coal tar—and its distillation; benzene, toluene, xylene,—orientation; mono-chlorobenzene, mono-nitrobenzene, benzene sulphonic acid and phenol, aniline,—diazotisation; benzyl chloride, benzal chloride, benzotrichloride, benzyl alcohol, benzaldehyde, benzoic acid, benzoyl chloride and salicylic acid.

### *Practical*

Preparation of salts in the pure state. Qualitative analysis of inorganic mixtures containing not more than *two* radicals from the following list—silver, lead, mercury, copper, bismuth, cadmium, tin, arsenic, antimony, iron, manganese, aluminium, chromium, zinc, cobalt, nickel, calcium, strontium, barium, magnesium, potassium, sodium, ammonium, and their oxides, hydroxides, chlorides, bromides, iodides, sulphides, sulphites, sulphates, chromates, carbonates, phosphates, nitrates, nitrites, borates, silicates, cyanides and thiocyanates. Alkalimetry, acidimetry, oxidation and reduction methods of volumetric analysis, gravimetric estimation of copper, silver, iron and sulphuric acid, determination of chemical equivalent. Identification of the following organic compounds given *singly*—

Methyl alcohol, ethyl alcohol, acetone, chloroform, formic, acetic, oxalic and tartaric acids, glycerol, citric acid, urea, dextrose, cane sugar, starch, benzene, benzoic acid, aniline, phenol, salicylic acid.

### HONOURS COURSE

In addition to a fuller treatment of subjects for the Pass Course, the following:—

#### PHYSICAL AND INORGANIC CHEMISTRY

##### *Theoretical*

Avogadro's number, Maxwell's law of distribution of velocities (excluding derivation), viscosity of gases and liquids, surface tension of liquids, elementary treatment of the two laws of thermodynamics and an outline of their application to solutions, chemical equilibrium and heat changes accompanying changes in states of aggregation and chemical re-actions and to the e.m.f. of cells, the phase rule and its application to two component systems, the order of re-actions (homogeneous and heterogeneous reactions), equilibrium in electrolytic solutions, elementary theory of indicators, double and complex salts, the hydrogen platinum and calomel electrodes, theory of the Weston cell and

of the lead accumulator, elementary ideas of the structure of atoms, elements of crystal structure, radio-active radiations and disintegration of radium, the simpler uses of the spectroscopic methods in chemistry.

Study of the following elements and their principal compounds:—Selenium, tellurium, lithium, caesium, rubidium, platinum, uranium, helium, neon and radium.

## ORGANIC CHEMISTRY

### *Theoretical*

Isonitrites, unsaturated hydrocarbons, *viz.*, propylene, butylene, isoprene, butadiene, unsaturated alcohols, *viz.*, allyl alcohol, geraniol; unsaturated aldehydes and ketones, *viz.*, acrolein, crotonaldehyde, mesityl oxide, phorone, unsaturated acids, *viz.*, acrylic acid, crotonic acid, dimethyl acrylic acid. Typical examples of halogen derivatives of acids, hydroxy, amino and ketonic acids; glutaric, adipic and pimelic acids, Baeyer's strain hypothesis, simple monocyclic compounds; uses of organo-metallic compounds of zinc and magnesium; more important synthetic uses of malonic, cyanacetic and acetoacetic esters. Maleic and fumaric acids; glycine; derivatives of carbonic acid.

Elementary treatment of monosaccharoses with special reference to glucose and fructose; of disaccharoses, namely cane-sugar, maltose and lactose. Simple exposition of the recent ideas of carbohydrate constitution.

Uric acid and caffeine (omitting synthetic details). Simpler derivatives of benzene, *viz.*, haloid, nitro amino, hydroxy derivatives and sulphonic acids. Simpler azo-compounds; cresols, quinone, phthalic acid, cinnamic acids, stoluic acids, salicylic aldehyde: benzal-acetone, naphthalene, anthracene and their simpler derivatives.

Indigo, methyl orange, alizarine, congo red, phenolphthalein, fluorescein, malachite green and rosaniline (Preparation and uses only).

Pyrrole and pyridine, properties and tests of quinine and brucine.

## PHYSICAL CHEMISTRY

### *Practical*

Density and surface tension of liquids by drop method, solubilities of salts, vapour density by Victor Meyer's method, velocity of hydrolysis. Identification of the most important lines of helium, hydrogen, lithium, sodium, potassium, calcium, barium and mercury in a spectroscope with attached wave-length scale.

## INORGANIC CHEMISTRY

*Practical*

The mixtures for qualitative analysis may include not more than four radicals, positive or negative, selected from the list given under the Pass syllabus with the following additions:—Hypochlorite, hypophosphite.

A more complete knowledge of volumetric and gravimetric analysis including separation of copper and iron, copper and zinc, iron and manganese, iron and zinc, analysis of brass, pyrolusite and haematite.

## ORGANIC CHEMISTRY

*Practical*

Detection of carbon, nitrogen, sulphur, halogens and phosphorous in organic compounds. Preparation of (1) ethyl bromide, (2) iodoform, (3) oxalic acid, (4) *p.* & *o.*-nitraniline, (5) acetanilide, (6) methyl orange, (7) anhydride of succinic or phthalic acid, (8) esterification and (9) anthraquinone.

Qualitative analysis of a mixture of two organic compounds which include the following in addition to the Pass list:—succinic acid, benzaldehyde, lactose, dimethyl-aniline.

The Laboratory note-books of candidates shall be records of the work done. Note-books which have not been certified to be actual records of work done in the laboratory and written in the class room, by the teacher under whom the candidates worked, will not be accepted.

## BOTANY

## PASS COURSE

There shall be two papers each of three hours' duration and carrying one hundred marks each. There shall be a practical examination of five hours' duration carrying one hundred marks.

The papers shall be distributed as follows:—

*Paper I*

Morphology, Histology, Gymnosperms and Angiosperms

*Paper II*

Cryptogams, Physiology, Ecology, Elementary facts of evolution and heredity.



*Paper III**Practical*

Each paper shall include six questions with alternatives of each, distributed over the whole of the subject included in it.

The practical examination shall include—

- (i) Morphology (making of sections and description accompanied by labelled sketches).
- (ii) Description and identification of Phanerogamic specimens.
- (iii) Identification of specimens or preparations (chiefly from Cryptogams).
- (iv) Physiology, explanation of the use of apparatus or setting up of simple experiments.
- (v) Laboratory note-books and records of field work.

*Theoretical*

The course shall include the following:—

I. Morphology: A general study of the structure and life-history of representative types belonging to the main divisions of the plant kingdom.

II. Histology: A detailed knowledge of the structure of the cell and cell-contents, cell division, cell fusion, primary and secondary tissues. A general knowledge of the histology of the principal vegetative and reproductive organs from the ecological and developmental point of view.

III. Vegetable Physiology: A general knowledge of the physiology of nutrition, growth and movements. Special attention will be paid to the following:—

Osmotic properties of the cell; absorption of water; movement of water and gases within the plant; chemistry of the plant-body; food materials of plants; their sources and form; assimilation of Carbon and Nitrogen by autotrophic and heterotrophic plants; special modes of nutrition; reserve materials; digestion; respiration; fermentation; growth and factors influencing it; movement of protoplasm; action of gravity; heat and light; mechanical movements (hygroscopic movements; dehiscence of fruits; mechanical ejection of seeds); autonomous and induced movements; the important tropisms; nasties; taxis; asexual and sexual propagation of plants.

IV. The Classification of plants: Elementary knowledge of the principles of classification; outlines of main systems of classification; artificial, natural and phylogenetic systems. A

general knowledge of the life-history and relationships of the following groups of plants:—

1. Schizomycetes—A general account of the group.
2. Schizophyceae—Oscillatoria, Nostoc, Gleocapsa.
3. Bacillariophyta—A general account.
4. Conjugatae—Cosmarium, Zygnema, Spirogyra.
5. Chlorophyceae—Volvox, Protococcus, Ulothrix, Oedogonium, Caulerpa, Vaucheria.
6. Charophyta—Chara.
7. Phaeophyceae—Ectocarpus, Fucus.
8. Rhodophyceae—Batrachospermum. Polysiphonia.
9. Eumycetes—Phytophthora, Peziza, Mucor, Aspergillus, Ustilago, Puccinia, Agaricus.
10. Lichens—A general account of the group.
11. Archegoniatae—
  - (i) Bryophyta; Marchantia, Anthoceros, Riccia, Polytrichum.
  - (ii) Pteridophyta; Polypodium, Marsilia, Equisetum, Lycopodium, Selaginella, Isoetes.
12. Spermatophyta—
  - (i) Gymnospermae; Cycas, Pinus, Gnetum.
  - (ii) Angiosperms.
    - (a) Monocotyledons; Gramineae, Cyperaceae, Palmaceae, Aroideae, Commelinaceae, Liliaceae, Amaryllidaceae, Scitamineae, Orchidaceae.
    - (b) Dicotyledons; Urticaceae, Moraceae, Polygonaceae, Amarantaceae, Nyctaginaceae, Nymphaeaceae, Ranunculaceae, Magnoliaceae, Anonaceae, Cappariaceae, Cruciferae, Leguminosae, Rutaceae, Euphorbiaceae, Anacardiaceae, Sapindaceae, Vitaceae, Tiliaceae, Malvaceae, Sterculiaceae, Myrtaceae, Umbelliferae, Apocynaceae, Asclepiadeaceae, Convolvulaceae, Boraginaceae, Verbenaceae, Labiatae, Solanaceae, Scrophulariaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Compositae.

Special attention shall be paid to the plants of economic and medicinal importance belonging to the above families.

V. Ecology: General principles of the Ecology of plants.

VI. An elementary knowledge of the theories of evolution and heredity.

### *Practical*

1. The making, staining and description of microscopical preparations of plants.

2. Referring plants to their Families and identification by means of analytical tables up to Genera.

3. Drawing of dissections of flowers and their parts and of microscopical preparations.

4. Physiological experiments:

Osmotic properties; Water-culture experiments; Transpiration and root pressure experiments; Experiments on chlorophyll; Experiments on the relation between starch formation and external conditions. Simple experiments on respiration and fermentation. Movements of growth. Germination experiments.

5. Excursions shall be made for the systematic and ecological study of plants in nature and a record of the observations made in the field maintained.

6. The Laboratory note-books and records of field work of candidates shall be inspected and marked by Examiners and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

### HONOURS COURSE

There shall be four papers, each of three hours' duration and carrying 100 marks each. In addition there shall be two practical examinations, each of six hours' duration and carrying 100 marks each.

The papers shall be distributed as follows:—

#### *Theoretical*

*Paper I*—Algae, Fungi, Bryophyta.

*Paper II*—Pteridophyta and Gymnosperms, including fossil types.

*Paper III*—Angiosperms, Economic Botany, Plant-geography, Evolution and Genetics.

*Paper IV*—Physiology and Ecology.

#### *Practical*

*Paper V*—Morphology (Cryptogams and Phanerogams) and Systematic Botany.

*Paper VI*—Physiology and Microtechnique.

#### *Theoretical*

I. *Morphology*: A general study of the structure and life-history of representative types belonging to the main divisions of the plant kingdom as is necessary to elucidate the relation-

ships of plants. Morphology shall be studied from the comparative as well as the organographic points of view.

II. *Histology*: A detailed knowledge of the structure of the cell, cell-contents, cell-division, cell-fusion, primary and secondary tissues. A general knowledge of the histology of the principal vegetative and reproductive organs from the physiological, ecological and embryological points of view.

III. *Vegetable Physiology*: A general knowledge of the physiology of nutrition, growth, movements and reproduction of plants. Special attention will be paid to the following:—

Osmotic properties of the cell; absorption of water; transpiration, the ascent of sap; constituents of the ash of plants; carbon-assimilation in autotrophic plants; nitrogen assimilation in autotrophic plants; utilisation and transport of assimilatory products; metabolism of heterotrophic plants; respiration; fermentation; oxidation of inorganic substances; assimilation of carbon in the absence of light and chlorophyll; fixation of nitrogen; symbiosis; the energy relations of the plant; the growth of the cell; growth of the plant as a whole; influence of external factors on growth and form; inner factors controlling growth and form; growth-hormones; the development of the plant under the influence of the internal and external factors; movements of plants; hygroscopic movements; explosive mechanism; tropism; nasties; autonomous movements; locomotory movements; taxis.

IV. *Ecology and Plant-Sociology*: A general knowledge of the mutual relations of plants and their surroundings; the various plant communities including their origin, development and successions.

V. *The classification of Plants*: (1) Principles of classification; outlines of the main systems of classification; artificial, natural and phylogenetic systems; trend of modern systematic Botany; (2) a general knowledge and phylogenetic relationships of the groups of plants mentioned below:—

1. Schizomycetes—A general account of the group.
2. Schizophyceae—Oscillatoria, Nostoc, Anabaena, Gloeocapsa.
3. Myxomycetes—A general account of the group.
4. Bacillariophyta—A general account of the group.
5. Conjugatae—Cosmarium, Zygnema, Spirogyra.
6. Chlorophyceae—Chlamydomonas, Volvox, Protococcus, Botrydium, Hydrodictyon, Ulothrix, Chaetophora, Trentepohlia, Coleochaete, Oedogonium, Caulerpa, Vaucheria.
7. Charophyta—Chara, Nitella.

8. Phaeophyceae—Ectocarpus, Laminaria, Fucus, Dictyota.
9. Rhodophyceae—Batrachospermum, Compsopogon, Ceramium, Polysiphonia.
10. Phycomycetes—Saprolegnia, Phytophthora, Pythium, Mucor, Philobolus.
11. Ascomycetes—Aspergillus, Penicillium, Peziza, Claviceps, Saccharomyces.
12. Basidiomycetes—Ustilago, Tilletia, Puccinia, Agaricus, Polyporus, Phallus.
13. Lichens—A general account of the group.
14. Archegoniatae—
  - (i) Marchantia, Riccia, Anthoceros, Sphagnum, Polytrichum, Barbula, Lejeunia.
  - (ii) Ophioglossum, Polypodium, Marsilia, Salvinia, Azolla, Equisetum, Lycopodium, Selaginella, Psilotum, Isotetes.

A general account of Psilophytales, Sphenophyllales Calamities.
15. Spermatophyta—
  - (i) Gymnospermae: Cycas, Ginkgo, Pinus, Ephedra, Gnetum.  
General account of Cycadofilicales, Cordaitales and Bennettitales.
  - (ii) Angiosperms.
    - (a) Monocotyledons: Alismataceae, Gramineae, Cyperaceae, Palmaceae, Aroideae, Commelinaceae, Liliaceae, Amaryllidaceae, Scitamineae, Orchidaceae.
    - (b) Dicotyledons: Urticaceae, Moraceae, Polygonaceae, Amarantaceae, Nyctaginaceae, Portulacaceae, Nymphaeaceae, Ranunculaceae, Magnoliaceae, Anonaceae, Papaveraceae, Capparidaceae, Cruciferae, Rosaceae, Leguminosae, Rutaceae, Euphorbiaceae, Anacardiaceae, Sapindaceae, Vitaceae, Tiliaceae, Malvaceae, Sterculiaceae, Dipterocarpaceae, Passifloraceae, Myrtaceae, Melastomaceae, Umbelliferae, Oleaceae, Gentianaceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Boraginaceae, Verbenaceae, Labiatae, Solanaceae, Scrophulariaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Compositae.

Special attention shall be paid to plants of economic or medicinal importance belonging to the above families.

VI. *Plant Geography*: The main factors affecting the distribution of plants, internal and external; means of plant dis-

persal. The general principles of the distribution of plants on earth and a special study of the plant-geographic divisions of India.

VII. A general knowledge of the theories of Evolution and Heredity. Principles of Genetics, Mendelism. Application of Mendelian principles to Plant-breeding. Production of new and improved varieties of agricultural crops.

### *Practical*

I. Submission of practical and field note-books duly certified by the teachers from time to time.

II. Candidates will be expected to (a) dissect and describe fresh and dried specimens of plants in simple technical language and identify them with the help of a flora, (b) to prepare, stain and make permanent mounts of microscopic preparations and to be familiar with general histological methods including the use of the micritome, camera lucida and ocular micrometer, (c) to perform micro-chemical tests and (d) to perform simple physiological experiments and to explain the use of physiological apparatus.

III. Collection and preservation of specimens from botanical excursions.

The Laboratory and field note-books of candidates shall be inspected and marked by examiners and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## GEOLOGY

### PASS COURSE

Besides a fuller treatment of the subjects prescribed for the Intermediate Examination in Science a knowledge of the following subjects shall be required:—

### *Theoretical*

Origin of land forms. Origin of mountains.

General mathematical relations of crystals. The relation of physical properties to geometrical forms of crystals. General principles of optical crystallography.

Nicol's prism. Essential parts of a polarising microscope and their uses. Methods of studying minerals in thin sections under the microscope.

Method of calculating the formula of a mineral from its analysis. Isomorphism. Classification of minerals. Description of the following minerals:—

Silver, copper, arsenic, antimony, bismuth, mercury, platinum, realgar, orpiment, stibnite, bismuthinite, molybdenite, argentite, chalcocite, millerite, niccolite, pyrrhotite, brunite, cobaltite, marcasite, arsenopyrite, bournonite, pyrargyrite, proustite, tetrahedrite, sylvite, cryolite, carnallite, tridymite, opal, cuprite, periclase, zincite, ilmenite, spinel group, chrysoberyl, cassiterite, rutile, octahedrite, brookite, diaspore, limonite, brucite, gothite, calcite group, aragonite group, malachite, azurite, leucite, the pyroxenes, the amphiboles, beryl, cordierite, nepheline, cancrinite, sodalite group, garnet group, olivine group, topaz, scapolite group, vesuvianite, zircon, andalusite, sillimanite, staurolite, cyanite, epidote group, axinite, prehnite, zeolite group, mica group, chloritoids, chlorites, serpentine, chrysocolla, sphene, columbite, tantalite, samarskite, monazite, apatite group, turquoise, soda nitre, borax, pitchblende, barite group, crocoite, epsomite, the alums, wolframite, scheelite and wulfenite.

Optical characters of the more important rock-forming minerals. Macroscopic and microscopic description of the leading varieties of rocks and their modes of occurrence. A general knowledge of the mode of consolidation of magma, petrographic province and magmatic differentiation.

A general knowledge of metamorphism of rocks of different kinds.

Definition of an ore. Distribution in India and mode of occurrence of the following:—Gold, manganese, copper and iron ores; mica, coal and mineral oil. A general knowledge of the uses, if any, of the minerals and rocks prescribed in this syllabus.

Morphological characters of the following classes of fossils including their classification and distribution in geological time:—Protozoa, corals, echinoids, crinoids, brachiopoda, lamellibranchiata, gastropoda, cephalopoda, trilobites and graptolites.

A general idea of the organic evolution as indicated by fossils.

Measurement of geological time. The principles of correlation. Description of the leading lithological characters and distinctive fossils of the stratigraphical units of India.

### *Practical*

Recognition of the specimens of minerals mentioned in the syllabus by their physical and chemical tests. Drawing and description of crystals. Use of contact goniometer. Recognition

of the leading varieties of rocks and important rock-forming minerals by their macroscopic and microscopic characters.

Recognition of the following genera of fossils:—

Lepidodendron, Sigillaria, Sphenophyllum, Schizoneura, Calamites, Psygmoephyllum, Pecopteris, Noeggerathiopsis, Cycadites, Nilssonina, Otozamites, Pterophyllum, Brachyphyllum.

Orbitolites, Alveolina, Nodosaria, Textularia, Globigerina, Orbitoides, Fusulina, Schwagerina.

Omphyma, Cyathophyllum, Montlivaltia, Isastrea, Cyclo-lites, Thamnastrea, Trochosmia, Favosites, Syringopora, Haly-sites.

Stoliczkaria, Didymograptus, Monograptus.

Cupressocrinus, Cyathocrinus, Marsupites, Ecerinus, Pentacrinus.

Echinosphaerites.

Pentremites.

Clypeaster, Echinolampas, Hemiasper, Schizaster.

Fenestella, Protoretopora.

Lingulella, Neobolus, Lingula, Crania, Enteleles, Rafinesquina, Leptaena, Strophomena, Streptorhynchus, Chonetes, Lyttonia, Camarophoria, Rhynchonella, Atrypa, Syringothyris, Spiriferina, Spirigera, Spirigera.

Stringocephalus, Dielasma, Terebratula.

Palaeoneilo, Nucula, Leda, Unio, Myophoria, Trigonia, Astarte, Crassatella, Lucina, Cardium, Protocardium, Cyrena, Venus, Cytherea, Tellina, Pholadomya, Corbula, Avicula, Pseudomonotis, Monotis, Halobia, Aviculopecten, Pinna, Gervillia, Perna, Inoceramus, Lima, Pecten, Plicatula, Spondylus, Gryphaea, Exogyra, Mytilus, Modiola.

Dentalium, Pleurotomaria, Euomphalus, Turbo, Trochus, Nerita, Natica, Scalaria, Melania, Cerithium, Rostellaria, Cypraea, Ovula, Murex, Fusus, Voluta, Pleurotoma, Conus, Avellana, Limnaea, Bullinus, Planorbis.

Hyolithes, Tentaculites, Conularia, Clymenia, Goniatites, Hedenstroemia, Ophiceras, Meekoceras, Aspidites, Xenodiscus, Flemingites, Octoceras, Ptychites, Proptychites, Tropites, Halorites, Arcestes, Phylloceras, Lytoceras, Hamites, Turritites, Baculites, Harpoceras, Stephanoceras, Macrocephalites, Perisphinctes, Hoplites, Acanthoceras, Scaphites, Indoseras.

Olenellus, Olenus, Ptychoparia, Illaenus, Phacops.

Estheria, Cypris.

Description from personal observation of the geological features of an area. Solution of simpler problems on dip, strike and outcrop.

The Laboratory and field note-books of candidates shall be inspected and marked by examiners, and if they are found to



be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

### HONOURS COURSE

In addition to a more complete and detailed knowledge of the subjects prescribed for the Pass Course candidates will be expected to show an acquaintance with:—

#### *Theoretical*

1. The genesis of rocks and of the structures found in them. Diagrammatic representation of igneous rock series.
2. The economic aspects of rock and mineral deposits with special reference to India; the modes of occurrence, origin and distribution in space and time of such deposits. General principles of prospecting.
3. A general knowledge of the more important vertebrate fossils. The leading Indian fossil species which may be regarded as index species.
4. The leading concepts regarding the age of the earth, isostasy and the origin of continents and seas.

#### *Practical*

1. Stereographic projection of simple crystals and calculation of their axial ratio.
2. The use of quartz wedge.
3. Geological mapping of a small area. General knowledge of prospecting and development of economic mineral deposits. Personal observation of deposits of at least three of the following:—Coal, Mica, Manganese, Iron and Copper ores.
4. Examination of polished sections of some of the common ore minerals:—Galena, chalcopyrite, chalcocite, bornite, sphalerite, pyrite, pyrrhotite, magnetite, hematite, ilmenite, rutile, psilomelane, pyrolusite, hollandite, braunite, sitaparite.
5. Separation of mineral grains; panning, heavy liquids, electromagnets.
6. Use of refractive index of liquids for mineral determination.

The Laboratory and field note-books of the candidates shall be inspected and marked by the examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

The lists of minerals and fossils in the Pass and Honours syllabus may be modified by the Syndicate on the recommendation of the Board of Studies in Geology and Mineralogy.

## ZOOLOGY

### PASS COURSE

#### *Theoretical*

1. General principles of Biology. The cell in development and inheritance. General notions of Evolution, variation and heredity. Evidences of Evolution.

2. Distinctive characters and broad outline classification of Protozoa:—types—Amœba, Polystomella, Euglena, Paramoecium, Vorticella, Monocystis.

3. Distinctive characters and broad outline classification of Porifera:—type—Sycon.

4. Distinctive characters and classification of Coelenterata:—types—Hydra, Obelia, Aurelia.

5. Distinctive characters and broad outline classification of Platyhelminthes:—types—Liver fluke (*Fasciola*), *Taenia solium* (particularly life-history).

6. Distinctive characters and broad outline classification of Nematelminthes:—type—*Ascaris*.

7. Distinctive characters of Annelida and broad divisions into classes:—types—Nereis, Earthworm, Leech. General outline of life-history of *Polygordius*. Structure of Trochophore larva.

8. Distinctive characters and broad outline classification of Echinodermata:—type—Starfish.

9. General characters of Arthropoda and distinctive characters of its subdivisions:—types—Prawn, Cockroach, Scorpion.

10. Distinctive characters and broad outline classification of the Mollusca:—types—Fresh-water mussel, Applesnail (*Pila*) and *Sepia*.

11. Distinctive characters of the Chordate groups and their leading subdivisions:—Hemichorda, Urochorda, Euchorda and Vertebrata Classes. Structure and an outline of the life-history of the following types:—

- (1) *Amphioxus*.
- (2) A common Teleost.
- (3) Dog-fish.
- (4) *Rana* or *Bufo*.
- (5) *Calotes*.
- (6) Pigeon.
- (7) Guinea-pig or Rabbit.

12. Detailed study of (a) Skull of Dog, (b) Limbs of Horse.
13. An outline of development of Frog, Chick and Rabbit.

### *Practical*

1. Microscopical examination of types mentioned in Protozoa and Coelenterata and examination of tissues and organs of Earthworm, Leech, Frog and Rabbit.

2. Dissection of Earthworm, Prawn, Cockroach, Fresh-water mussel, Teleost, Toad, Pigeon, Guinea-pig.

3. Microscopic examination, wherever possible, of all the types studied.

Distribution of theoretical papers will be as follows:—

*First Paper* ... Invertebrata.

*Second Paper* ... General and Chordata.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the teacher under whom the candidates worked, will not be accepted.

### HONOURS COURSE

#### *Theoretical*

A more detailed classification of the groups mentioned in the Pass Course.

In addition to the Pass Course, the following types in the theoretical course:—

1. Life-history of Malarial Parasite.
2. Canal system of Sponges.
3. Sea-anemone and distinctive features of Ctenophora.
4. Planaria.
5. An Echinroid and a Holothurian.
6. (a) General characters of Entomostraca. Life-history of Sacculina.  
(b) Scolopendra, Limulus.  
(c) Peripatus.
7. Life-history of Mosquito Balanoglossus, Ciona, Cyclostomata.
8. General characters of Dipnoi.
9. Anatomical peculiarities of Snakes.
10. Orders of Mammals and their distinctive features.

*Practical*

The following in addition to the Pass Course:—

1. Leech, Scorpion, Pond Snail, Scoliodon, Calotes.
2. Staining and mounting in bulk microscopical objects.

Distribution of theoretical papers will be as follows:—

<i>First Paper</i>	... Invertebratâ.
<i>Second Paper</i>	... Chordata.
<i>Third Paper</i>	... General and Embryology.
<i>Fourth Paper</i>	... Essay.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the teacher under whom the candidates worked, will not be accepted.

## PHYSIOLOGY

## DISTRIBUTION OF PAPERS

*(Pass)*

Theoretical Paper I—Blood and its circulation, Respiration, Kidney, Skin and Regulation of Temperature, Reproduction, and Sense Organs.

Theoretical Paper II—Endocrine Organs, Nervous System, Nerve-Muscle Physiology, Biochemistry, Alimentation and Metabolism.

Practical Paper—Histology, Experimental Physiology, and Biochemistry.

*(Honours)*

Theoretical Paper I—Blood and its Circulation, Respiration, Lymph, and Tissue Fluid.

Theoretical Paper II—Biochemistry, Alimentation and Metabolism, Nutrition and Dietetics.

Theoretical Paper III—Endocrine Organs, Kidney, Skin and Regulation of Temperature, and Reproduction.

Theoretical Paper IV—Nervous System, Sense Organs and Nerve-Muscle Physiology.

Practical Paper V—Histology, Biochemistry, and Experimental Physiology (Biophysics).

Practical Paper VI—Histology, Biochemistry, and Experimental Physiology (Biophysics).

## DETAILED SYLLABUS

## PASS COURSE

*Theoretical*

## 1. Introduction.

The Cell and its differentiation.  
 Characteristics of Living Matter.  
 Nitrogen and Carbon cycle.

## 2. Biochemical Basis of Life.

Chemistry of Carbohydrates, Lipides and Proteins.  
 Catalysis and Enzyme action.  
 Chemistry of body fluids and excretion—Reaction of body fluids.

Elementary knowledge of diffusion, dialysis, osmosis, and properties of colloid.

## Alimentation, Metabolism, Dietetics and Nutrition.

Exchange of matter and energy in the body.

Basal Metabolism.

Vitamins—Biological values of different proteins.

Mineral metabolism and requirements—Water balance of the body.

Normal Diet.

## The Digestive Organs and their Functions—

Movements of the alimentary canal.

Absorption of various foodstuffs and their metabolism.

## 3. The Circulatory System.

## Blood—

General composition of blood plasma and formed elements.

Origin, fate and functions of the formed elements.

Haemoglobin and its derivatives.

Coagulation of blood.

## Immunity.

## The Course and Proof of Circulation.

## Anatomy and Histology of the Heart—

Properties of cardiac muscle.

Elementary knowledge of cardio-dynamic events.

Nutrition of heart and coronary circulation.

Innervation of heart and regulation of its beat.

Venous return and Diastolic pulse.

## Vascular System—

Haemodynamics of Circulation.

Circulation through arteries, capillaries and veins—Blood pressure—Pulse—Velocity of blood flow and time of complete circulation.

Venous pulse.

Innervation of blood vessels and control of circulation.

Spleen and its Functions.

Lymph and Tissue Fluids.

#### 4. The Respiration System.

The Lungs—Mechanism of respiratory movements—Spirometry.

Chemistry of respiration.

Gases in blood and their tension.

Transport of oxygen and carbon dioxide in blood.

Mechanism of external and internal respiration.

Regulation of respiratory movements.

Abnormal respiration—Cheyne-Stokes Respiration—Apnoea—Dyspnoea—Asphyxia.

Effects of high and low atmospheric pressure on breathing—

Mountain sickness—Caisson disease.

Artificial respiration.

#### 5. The Excretory System.

Kidney—Formation and chemical composition of urine.

Mechanism of micturition.

#### 6. The Integumentary System.

Structure and function of skin—Formation of sweat.

Body temperature and its regulation.

#### 7. Physiology of Movement.

Nerve-muscle physiology—Different types of muscles in the body.

Changes on excitation and nature of the contractile process.

The Neurone.

Excitation process in a nerve and its propagation.

Changes undergone by a nerve on stimulation.

Neuro-muscular junction.

#### 8. The Nervous System.

Neurones and their connections.

Structure and functions of the Spinal Cord—Reciprocal innervation—Co-ordinated movement.

Structure and functions of the Hindbrain, Midbrain, Fore-brain and Cerebrum—Cranial nerves, their origin and distribution.

Cerebral hemispheres—Anatomy, connections and histology of the Cortex—Localisation of functions of the cortex—Conditioned reflex.

Autonomic nervous system—General arrangement.

## 9. The Sense Organs.

General features of sensation—Classification of sensations—Exteroceptive, propoceptive and enteroceptive sensations—Sensory end organs—Sensory pathways.

- (a) Vision—Anatomy of the Eye—Optical system—Errors of refraction.

Structure and functions of Iris—Mechanism of accommodation.

Structure and functions of Retina—Changes in retina when exposed to light—Visual field—Perimetry—Visual pathway.

Elementary knowledge of Colour vision.

- (b) Hearing—Anatomy of the Ear—Helmholtz's theory of hearing—Nervous pathways of hearing.

- (c) Sensations of Taste and Smell—Structure of receptor organs—The sensory pathways.

- (d) Cutaneous sensations.

## 10. Voice and Speech—Mechanism of the Larynx.

## 11. The Endocrine Organs.

Hormones—Methods of investigation of endocrine functions. Structure and general functions of—

- (a) Thyroid.
- (b) Parathyroid.
- (c) Suprarenal.
- (d) Islets of Langerhaus.
- (e) Sex Glands.
- (f) Pituitary.

## 12. Reproduction.

*Practical**Histology*

*The Microscope*—its use and care.

Examination of fresh tissues and blood.

Film preparation of blood.

Preparation of haemin crystals.

*Histological examination by Teasing*—Preparation of nerve and muscle fibres by teasing and staining.

*Histological examination by Spreading*—Silver nitrate preparation of cornea, mesentery, bladder.

*Staining and mounting of Sections and their examination*—Cartilage, bone, muscle, trachea, lungs, oesophagus, stomach, intestine, salivary glands, pancreas, liver, kidney, spinal cord, cerebrum, cerebellum, lymph glands, suprarenal, spleen.

*Haemocytometry and Haemoglobinometry.*

## EXPERIMENTAL PHYSIOLOGY (BIOPHYSICS)

1. Dissection of a Frog.
2. (a) Effects of make and break shocks on frog's muscle;  
(b) Elasticity and extensibility of muscle.
3. Simple muscle curve—Effects of load and temperature on frog's muscle.
4. Summation of contractions—Tetanus.
5. Fatigue of frog's muscle.
6. Recording of frog's heart-beat—Effect of temperature on heart.
7. Spirometry.
8. Records of respiratory movements in Man.
9. Use of Sphygmomanometer.

## BIOCHEMISTRY

1. Simple chemical tests and identification of Starch, Dextrin, Glucose, Cane Sugar, Lactose, Maltose, Fructose, Protein, Gelatine, Peptone, Lactic acid, Dilute hydrochloric acid in Gastric juice, Bile salts and pigments.
2. Emulsification and saponification of Fat.
3. Separation of Albumin, Proteoses, Peptones and Globulin.
4. Action of acids and alkalies on Proteins.
5. Examination of Urine—Reaction of urine—Tests for Acetone, Albumin, Sugar, Urea, Uric acid, Bile salts and pigments, Lactic acid, Hydrochloric acid, Indican.
6. Simple experiments on Salivary, Peptic and Pancreatic digestions.
7. Qualitative chemical analysis of some simple food-stuffs—Milk, Flour, Egg, Rice, Potato, etc.
8. Quantitative estimation of Chloride, Phosphate, Dextrose and Urea in Urine.
9. Spectroscopic examination of Haemoglobin and its derivatives.

## HONOURS COURSE

*Theoretical*

In addition to a more complete and detailed study of the subjects prescribed for the Pass Course, the following:—

Reproductive Organs—Development of fertilised ovum—Germinal membranes, Hormones of the Placenta and Mammary gland.

Energy of molecules and ions in solution—Surface action—Adsorption—Colloidal state of matter—Passage of water and



solutes across membranes—Hydrogen ion concentration and its regulation—Oxidation—Reduction.

Methods of determination of basal metabolism—Factors modifying basal metabolism—Metabolism during starvation.

Carbohydrate metabolism—Maintenance of blood sugar level—Glycosuria—Hormonal control of carbohydrate metabolism—Metabolism of lipides.

Metabolism of Nucleoproteins—Creatine—Creatinine—Protein—Sulphur—Iron.

Normal requirements of various components of food.

Volume of blood in the body—Plasma proteins and their functions—Constancy of blood—Cytology of erythrocyte—Fragility of red blood cells—Blood groups—Reticulo-endothelial system—Immunity.

Regulation of coronary flow—Electrocardiogram—Heart block—Auricular flutter and Fibrillation—Output of heart—Origin and propagation of cardiac impulse—Adaptation of cardiac activity—Metabolism of cardiac muscle—Venous pulse—Circulation time in man—Intracardiac pressure—Regulation of blood pressure—Control of veins and capillaries—Topical circulation, *e.g.*, cerebral, pulmonary, hepatic and renal—Circulation in foetus. Cerebro-Spinal fluid and its circulation.

Determination of gaseous metabolism—Methods of gas analysis in blood and air—Respiratory quotient—Regulation of breathing—Blood pressure, cerebral circulation and breathing—Carriage of gases in blood—Dissociation curves of blood gases—Oxygen content and capacity—Co-efficient of oxidation—Ionic interchange between corpuscles and plasma—Tissue oxidation.

Physiology of muscular exercise.

Muscle tone and regulation of posture—Functions of cerebral cortex—Corpus striatum—Thalamus and hypothalamus—Conditioned reflexes—Distribution and function of autonomic nervous system—Chemical transmitters.

Nutrition and protection of the Eye—Subjective and contrast phenomena—Theories of colour vision—Binocular vision—Theories of hearing—Cochlear response—Aphasia—Sensation, as of taste and smell—Cutaneous and Kinesthetic sensations—Laws of sensation—Sleep and hypnosis.

### *Practical*

In addition to the Pass Course the following:—

#### EXPERIMENTAL

1. Determination of Velocity of nerve impulse in frog's nerve.
2. Recording of fatigue of frog's muscle on slow-moving drum.

3. Electrotonus.
4. Stannius' ligature and experiments on properties of heart muscle.
5. Vagus stimulation of frog's heart.
6. Genesis of tetanus.
7. Calculation of work done by a muscle.
8. Effects of ions and drugs on frog's heart-beat.
9. Pulse tracing.
10. Use of Sphygmomanometer.
11. Indefatigability of nerve.

### HISTOLOGY

1. Cutting of sections by freezing method.
2. Staining of sections by different staining methods, *e.g.*, Haemotoxylin, Eosine, Azan, etc., and making of permanent preparations.
3. Counting of blood corpuscles.
4. Determination of size of microscopic objects.

### BIOCHEMISTRY

1. Determination of H-ion concentration by calorimetric method.
2. Estimation of sugar by Polarimeter.
3. Identification of sugars by osazone crystals.
4. Quantitative estimation of (a) Ammonia, Nitrogen in Urine, (b) Sulphate, (c) Lactose in Milk, (d) Cane sugar.
5. Determination of coagulation time.
6. Determination of blood sugar.

### PSYCHOLOGY

The examination in Pass Course shall consist of the following parts:—

#### A. THEORETICAL:—

1. General Psychology—First Paper.
2. Genetic and Abnormal Psychology—Second Paper.

#### B. PRACTICAL—Third Paper.

The examination in *Honours Course* shall consist of the following parts:—

#### A. THEORETICAL:—

1. General Psychology—*First Paper*.
2. Genetic and Abnormal Psychology—*Second Paper*.

3. Social Psychology and Histology of Psychology—*Third Paper.*

4. Educational and Industrial Psychology—*Fourth Paper*

B. PRACTICAL—*Fifth and Sixth Papers.*

## PASS COURSE

### *Paper I*

#### *Theoretical*

#### GENERAL PSYCHOLOGY

1. Introduction: Methods. Scope. Relation of Body and Mind. General idea of the Nervous System.

2. The Structural Standpoint: The conception of elements. The different elements. General idea about other standpoints.

3. Facts and Theories of different sensations. Structure and functions of sense organs. Measurement of sensations. The Weber-Fechner's Law.

4. Image, Image-types, Synaesthesia.

5. Attention: Facts and Theories.

6. Perception: Space and time perceptions, Perception of movement. Illusions. Hallucination. Meaning and theories of perception.

7. Memory and Association: Factors in Memory and conditions of Association, Forgetting, Measurement of Memory, Disorders. Theories of Memory.

8. Learning: Learning and Memory. Types of Learning. Laws of Learning.

9. Imagination: Nature. Different forms. Day-dreams. Dreams. Invention.

10. Feeling and Emotions: Experimental investigation, Facts and theories. Experimental aesthetics.

11. Action: Reaction experiments. Types of action, Fatigue. Concept of Will.

12. Thought: Analysis of the thinking processes. Belief. Experimental Studies. Language.

13. Intelligence: Nature and theories. General idea of different kinds of Tests and their uses.

14. Personality: Concept of personality. Factors, Types, Tests.

*Paper II**Theoretical*

## GENETIC AND ABNORMAL PSYCHOLOGY

**A. Genetic Psychology** ... 50 marks.

1. Definition. Scope. Methods.
2. Heredity and environment. Evolution. Classification of Animals.
3. Tropism. Reflex action. Instinctive action. Voluntary action.
4. Characteristic behaviours of the following invertebrates and Vertebrates: Amoeba, paramaecium, hydra, bolvox, molluscs, crabs, ants, amphioxus, fish, birds and dogs.
5. Nervous organisation and its relation to consciousness. Evidence of mind and criteria of consciousness.
6. Evolution of instinctive and intelligent behaviour.
7. The child: (a) Physical and mental development. (b) Instincts in children. (c) Development of language and social traits. (d) Adolescence.
8. Learning in child and animals.

**B. Abnormal Psychology** ... 50 marks.

1. Mental disorder. Different conceptions. Criteria of normality.
2. General ideas of different kinds of mental disorder.
3. Mental deficiency, Nature and grades. Signs of mental deficiency. Practical problems.
4. Hypnotism. Somnambulism. Dissociation.
5. Description of anxiety, neuroses, hysteria and epilepsy, Obsessional psycho-neuroses, dementia, praecox, paranoia.
6. Day-dreams, Dreams, Errors.
7. Mental conflict and its mechanism. Theories.
8. Principles of Mental adjustment with special reference to psycho-analysis.

*Paper III**Practical*

1. Accommodation. Far and Near points. Pupillary reflexes. Blind spot. Colour blindness.
2. Field of vision and colour zones. Perimeter.
3. Brightness, Colour contrasts. Colour mixtures.
4. Pressure—Temperature and pain spots. Paradoxical sensations of cold.
5. Tones and Noises. Resonance. Pitch. Intensity. Timbre. Beats.

6. Smell mixtures. Olfactometer.
7. Taste compensations.
8. Kinaesthetic sensations.
9. After-image, adaptation, localisation of sensations and effects of summation of stimuli.
10. Binocular rivalry, third dimension, two-point threshold. Perception of movement.
11. Illusions.
12. Feeling. Impression and expression: Pneumograph and Ergograph.
13. Attention: Range. Tachistoscope.
14. Image types.
15. Word association.
16. Memorisation. Learning and scoring methods.
17. Reaction time: Vernier. Hipp's Chronoscope (Make-Break).

*N.B.*—Students should be trained in introspection. They are required to keep records of practical work and to familiarise themselves with the apparatus used.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

### HONOURS COURSE

#### *Paper I*

#### *Theoretical*

#### GENERAL PSYCHOLOGY

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper I) in General Psychology.

Besides the structural standpoint, Gestalt and Behaviouristic standpoint should also be studied.

#### *Paper II*

#### *Theoretical*

#### GENETIC AND ABNORMAL PSYCHOLOGY

A. *Genetic Psychology* ... 50 marks.

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper II) in Genetic Psychology.

**B. Abnormal Psychology** ... 50 marks.

Detailed and critical study of the topics mentioned in the Syllabus for the Pass Course (Paper II) in Abnormal Psychology.

Greater stress should be laid on theories and historical approach to topics.

*Paper III*

*Theoretical*

**SOCIAL PSYCHOLOGY AND HISTORY OF PSYCHOLOGY**

**A. Social Psychology** ... 50 marks.

1. Introduction: Problems, Methods.
2. The Primitive Man: His society and religion.
3. Marriage: Exogamy, endogamy. Matriarchy, patriarchy.
4. Folklore. Myth. Rumour. Public opinion.
5. Psychology of crowds and mobs. Higher social groups.

**B. History of Psychology** ... 50 marks.

Broad outlines of History of Psychology—From the beginning of the Experimental period (J. Müller) up to the present time.

Students should be specially familiar with the Psychological systems of J. Muller, Fechner, Helmholtz, Wundt, Galton, Binet, James, Titchener, Freud, Watson, Kohler.

*Paper IV*

*Theoretical*

**EDUCATIONAL AND INDUSTRIAL PSYCHOLOGY**

**A. Educational Psychology** ... 40 marks.

1. Introduction. Problems. Methods.
2. Instinct and emotions. Development and bearing on education. Motivation in learning.
3. Learning: Methods, types and characteristics. Learning curve. Transfer of training.
4. Mental work. Mental fatigue.
5. Psychological tendencies in educational movements.
6. Educational tests.
7. Education of special types; Gifted, backward and defective children. Problem children.

**B. Industrial Psychology** ... 40 marks.

1. Introduction. Problems. Methods.
2. The work. The worker. The environment.
3. The work. The nature of work. Monotony. Variety. Rhythm.
4. Continuity and discontinuity.
5. Output: Maximum, optimum minimum. The work curve. Pause and rest. Planning of the work. Individual and chain work.
6. Movement.
7. The environment: Illumination. Noise. Smell. Posture. Temperature. Smoke. Dust. Humidity. Air movements.
8. Fatigue: Onset. Degree. Duration. Recovery. Fatigue curve. Measurement of fatigue. Endurance. Perseverance.
9. Accidents.
10. Advertisement. Salesmanship.

**C. Quantitative methods in Educational and Industrial Psychology** ... 20 marks.

1. Statistics. Formulae and their application. Graphs.
2. Tests for intelligence, personality and vocational aptitudes.
3. Methods of standardisation.

*Papers V and VI**Practical*

In addition to the Pass Course, Practical, the following:—

1. Statistical methods: Mean, Median, Mode, Average deviation, Standard deviation. Probable error. Correlation. Graphic representations.
2. Psycho-physical methods. Errors.
3. Sensory acuity. Threshold and differential limen.
4. Weber-Fechner's Law.
5. Fluctuation of attention.
6. Learning. Mirror drawing.
7. Mental work and fatigue.
8. Hipp's chronoscope. Choice reactions.

*N.B.*—Students should be trained in introspection. They are to keep records of practical work and to familiarise themselves with the apparatus used.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## ANTHROPOLOGY .

## PASS COURSE

The Pass Course in Anthropology shall be distributed as follows:—

*Paper I*

General outlines of Anthropology.

*Paper II*

Ethnology of India with special reference to some particular province. Chief Linguistic Families of India.

*Paper III**Practical*

## PHYSICAL ANTHROPOLOGY

## Somatometry

Candidates should be able to define the situation of and localise the somatometrical landmarks on living persons and are expected to be familiar with the abbreviations denoting them.

They should be familiar with the procedure adopted and the descriptive terms used in Anthropometry in making observations of the following external characters:—(1) Colour of Skin, (2) Colour of Eye, (3) Eyeslits, (4) Hair, (5) Moustache and Beard, (6) Eyebrows, (7) Forehead, (8) Supraorbital Ridges, (9) Nasal Depression, (10) Nasal Bridge, (11) Nasal Septum, (12) Malars, (13) Alveolar Prognathism, (14) Lips, (15) Chin, (16) Angle of Lower Jaw.

They should be familiar with the use of the following instruments used in Anthropometry:—calipers, craniometer, pelvimeter, slide compasses, anthropometer, rod compasses, metric tape, Mollison's goniometer, colorimeter, and scales for weight.

Candidates must be able to take the following measurements:—

## A.—On the Head

(1) Maximum head length, (2) Maximum head breadth, (3) Least frontal breadth, (4) Bi-zygomatic breadth, (5) Bigonial breadth, (6) Nasal length, (7) Nasal breadth, (8) Auricular height, (9) Physiognomic facial length, (10) Morphological facial length, (11) Physiognomic superior facial length, (12) Morpholo-



gical superior facial length, (13) Ear length, (14) Ear breadth, (15) Horizontal circumference, (16) Profile angle, (17) Camper's facial angle.

### B.—On the Trunk and Limbs

(18) Ht. vertex, (19) Ht. tragus, (20) Ht. sternale, (21) Ht. iliospinale, (22) Ht. tibiale, (23) Ht. spherion, (24) Ht. acromian, (25) Ht. radiale, (26) Ht. stylium, (27) Ht. dactylium, (28) Sitting height vertex, (29) Sitting height iliocristale, (30) Arm stretch, (31) Bi-acromial diameter, (32) Girth of thorax, (33) Length of hand, (34) Breadth of hand, (35) Length of foot, (36) Breadth of foot, (37) Weight of body ... 30 marks.

### Laboratory Book

Candidates shall keep a Laboratory book showing in details the somatometrical measurements of at least 10 subjects, and the different indices derived from the measurements, and shall submit it to the examiners. Credit should be given for work done in the laboratory ... 10 marks.

### TECHNOLOGY

Candidates are required to observe the following general points:—(a) Materials used for construction, (b) Shape, size and weight, (c) Decorations, if any, (d) Purpose, (e) Method of using.

#### I. Implements required for Procuring Food.

##### (A) Implements for the cultivation of plants:

- (1) Digging-stick.
- (2) Spade.
- (3) Pick.
- (4) Hoe.
- (5) Mattock.
- (6) Plough.
- (7) Roller.
- (8) Axe.
- (9) Harrow.
- (10) Rake.
- (11) Scythe and sickle.
- (12) Sowing instruments.
- (13) Appliances for threshing.
- (14) Appliances for cleaning grain, *e.g.*, winnowing fans.

## (B) Hunting accessories (other than weapons):

- (1) Traps.
- (2) Baits, decoys, lures and flares.
- (3) Nets.

## (C) Fishing appliances:

- (1) Nets, *e.g.*, hand-nets, cast-nets; seines; trawl-nets; self-acting nets. Floats and weights to be studied along with these.
- (2) Traps.
  - (a) Traps manipulated by the fisherman, *e.g.*, basket-traps; nooses; cage-traps.
  - (b) Self-acting traps, *e.g.*, basket-traps of the lobster-pot " and thorn-trap patterns; automatic traps.
- (3) Dams and weirs (to be studied from photographs).
- (4) Lines and their tackle.
- (5) Appliances for transfixing fish, *e.g.*, spears; harpoons; arrows; gaffs; tridents; leisters; gigs; rakes.

## II. Weapons of War and Chase.

## (A) Weapons of offence:

## (a) Held in the hand.

- (1) Ornaments, *e.g.*, rings and wristlets with spikes.
- (2) Clubs, *e.g.*, solid clubs and maces; composite clubs, maces and hammers.
- (3) Axes.
- (4) Spears.

## (b) Missile weapons.

- (1) Natural objects.
- (2) Worked or manufactured projectiles, *e.g.*, sling stones; pellets, etc.
- (3) Throwing-clubs, *e.g.*, boomerangs.
- (4) Throwing-spears, *e.g.*, javelins; harpoons darts; arrows.

## (c) Appliances for hurling or discharging.

- (1) Flexible spear-throwers.
- (2) Rigid spear-throwers.
- (3) Blow-tubes.
- (4) Bows, *e.g.*, plain bows; compound bows; composite-bows; pellet-bows; cross-bows.

## (d) Capturing weapons.

- (1) Lasso.
- (2) Bolas.

## (B) Weapons of defence :

- (1) Armour.
- (2) Parrying weapons.
- (3) Shields.

## III. Habitations.

*Note.*—(1) Purpose, (2) planning, (3) arrangement of parts, (4) materials, (5) mode of construction. (To be studied from photographs and actual specimens as far as possible.)

- (1) Caves, trees and other natural shelters.
- (2) Structures on piles.
- (3) Portable shelters and tents
- (4) Huts and houses on the ground.
- (5) Constructions below ground level.

## IV. Dress. (To be mainly studied in relation to a particular geographical area or group of peoples.)

*Note.*—(1) Method of wearing, (2) technique of weaving, (3) materials used, (4) socio-political and magico-religious significance, if any.

- (1) Lower garment.
- (2) Upper garment.
- (3) Ceremonial dress.
- (4) Seasonal dress.

In addition to these students should be acquainted with examples of skin and bark clothing **20 marks.**

Every student to produce a practical note-book showing records of work done on the objects mentioned above ... .. **10 marks.**

## PREHISTORIC ARCHÆOLOGY

## I. Identification of the following Paleolithic implements:—

## A. Of Stone—

- (1) Coup-de-poings.
- (2) Scrapers.
- (3) Points.
- (4) Knives.
- (5) Microliths.

## B. Of Bone—

- (1) Harpoons.
- (2) Batons.
- (3) Needles.

## II. Identification of the following Neolithic implements:—

- (1) Celts.
- (2) Hammer stones.
- (3) Ring stones.

... 20 marks.

Candidates must submit a note-book showing record of work done on the objects mentioned in the Syllabus.

... 10 marks.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## HONOURS COURSE

The Honours Course in Anthropology shall be distributed as follows:—

*Paper I.*—General outlines of Anthropology.

*Paper II.*—Ethnology of India with special reference to some particular province. Chief Linguistic Families of India.

*Papers III and IV.*—A general outline of the racial and cultural history of India.

*Papers V and VI.*—Practical Examination.

*Paper V*

## PHYSICAL ANTHROPOLOGY

A. *Anatomy and Morphology.*—Identification and sexing of human bones; identification of anthropoid crania; identification of casts of fossil men and apes. ... 15 marks.

B. *Somatometry.*—As for the Pass Course 30 marks.

C. *Craniometry.*—Candidates shall be familiar with the landmarks established on the skull for use in craniometry and shall be familiar with the use of the following apparatus:—Calipers (various types), slide compasses (various types), gonio-meters, carniphores, horizontal needles, orbitameter and palatometer.

Candidates should be able to take the following prescribed measurements in accordance with the International Agreements of 1906 and 1912:—(1) Maximum cranial length, (2) Glabella-inion, (3) Nasion-inion length, (4) Maximum cranial breadth, (5) Greatest occipital breadth, (6) Bi-mastoid diameter, (7) Bi-auricular breadth, (8) Greatest frontal breadth, (9) Least frontal breadth, (10) Bi-zygomatic breadth, (11) Bi-maxillary breadth,

(12) Outer bi-orbital breadth, (13) Inner bi-orbital breadth, (14) Nasion-basion line, (15) Prosthion-basion line, (16) Nasion-prosthion line, (17) Nasal length, (18) Nasal breadth, (19) Nasion-prosthion line, (20) Inter-orbital breadth, (21) Orbital breadth, (22) Orbital height, (23) Maxillo-alveolar length, (24) Maxillo-alveolar breadth, (25) Palatal length, (26) Palatal breadth, (27) Length of occipital foramen, (28) Breadth of occipital foramen, (29) Frontal chord, (30) Parietal chord, (31) Occipital chord, (32) Sagittal cranial arc, (33) Transverse cranial arc, (34) Horizontal circumference, (35) Frontal arc, (36) Parietal arc, (37) Occipital arc, (38) Basilo-bregmatic height, (39) Auriculobregmatic height, (40) Bi-condylar breadth, (41) Bi-gonial breadth, (42) Height of ramus, (43) Symphyseal height, (44) Minimum breadth of ramus, (45) Mandibular length, (46) Metopic angle, (47) Facial profile angle, (48) Nasal profile angle, (49) Alveolar profile angle, (50) Profile angle of the nasal roof, (51) Calvarial base angle, (52) Inclination angle of the occipital foramen, (53) Frontal angle of Schwalbe, (54) Bregma angle of Schwalbe, (55) Lambda angle of Schwalbe.  
... 30 marks.

D. *Laboratory Book*.—Candidates shall keep a Laboratory book showing (a) the somatometrical measurements of at least 10 subjects, (b) the craniometric measurements of at least 3 skulls. The various indices derived from the measurements shall be shown, and in the case of somatometric data, the averages with their standard deviations shall be calculated.

... 25 marks.

### *Paper VI*

#### TECHNOLOGY

Sections I, II, III and IV as in Pass Course (Paper III, Technology Section).

#### V. Means of travel and transport.

##### A. Travel and transport by land.

- (1) Ferries.
- (2) Bridges (details of types to be supplied later on).
- (3) Porters.
- (4) Pack animals.
- (5) Trailers and sledges.
- (6) Wheeled vehicles.

##### B. Travel and transport by water.

*Note*.—(1) Shape and size, (2) Method of construction, (3) Materials used, (4) Method of propulsion, (5) Purpose.

- (1) Rafts and floats.
- (2) Dug-outs.

- (3) Skin-boats, boats of basketry frame.
- (4) Earthen tubs used as boats.
- (5) Built-boats.

## VI. Industries.

### A. Basketry.

*Note.*—Students should be acquainted with the technique of the following types of baskets:

- (a) Plaited work.
  - (1) Check.
  - (2) Twilled.
  - (3) Wrapped.
  - (4) Twined.
  - (5) Hexagonal.
- (b) Wicker-work.
  - (1) Check.
  - (2) Twilled.
  - (3) Twined.
- (c) Wattle-work.
- (d) Coiled basketry.
  - (1) (i) Simple oversewn coil.
  - (ii) Furcate coil.
  - (iii) Bee-skeep coil.
  - (2) Figure of eight.
  - (3) 'Lazy Squaw.'
  - (4) Crossed figure of eight.
  - (5) Cycloid.
- (e) Matting.

B. Pottery (to be studied in relation to a particular area or group of peoples).

- Note.*—(1) Method of construction.
- (2) Decoration.
  - (3) Process of firing.
  - (4) Shape and size.
  - (5) Purpose.

... 40 marks.

Every student to produce a Practical note-book showing records of work done on the objects mentioned above.

... 10 marks.

## PREHISTORY ARCHÆOLOGY

(In addition to the syllabus prescribed for the Pass Course.)

## I. Identification of the following Paleolithic implements:—

## A. Of Flint and Stone—

- (1) Rostro-carinates.
- (2) Anvil stones.
- (3) Awl.
- (4) Disc.
- (5) Laurel-leaf points.
- (6) Willow-leaf points.
- (7) Core scrapers.
- (8) End scrapers.

## B. Of Bone—

- (1) Arrow-straighteners.
- (2) Lance points.

II. Identification of the following Neolithic tool: —  
Arrowheads.

## III. Identification of—

## A. Hand-made and Wheel-made pottery.

- B. (1) Schnurkeramik.  
(2) Bandkeramik.

- C. (1) Sarcophagus urns.  
(2) Cinerary urns.

## IV. Identification of the following Metal objects:—

## A. Of Bronze—

- (1) Celts.
- (2) Spear-heads.
- (3) Daggers.
- (4) Swords.

## B. Of Iron—

- (1) Swords.
- (2) Daggers.

... 40 marks.

Candidates must submit a note-book showing records of work done on the objects mentioned in the syllabus. 10 marks

Suitable Books, Papers and other sources of study will be recommended from time to time by the Board of Higher Studies in Anthropology with a view to indicate the scope and extent of the knowledge expected to be possessed by the candidates.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## GEOGRAPHY

### PASS COURSE

#### *Theoretical*

#### Paper I—Regional Geography—

(a) Asia with fuller treatment of India.

(b) Europe and one of the following as may be prescribed from time to time by the Syndicate: Africa, North America, South America and Australasia.

Natural regions, their relationships to political territories, and their economic importance; group life in various environments; the chief racial and national characteristics; the degree of adaptability to the physical environment; the distribution and influence of various types of rocks on the topographical features in so far as they determine human activities; topographical features determined by climate, form of erosion, and tectonic movements; the river systems; climate and weather types; the influence of the neighbouring seas and oceans on the lands and their inhabitants; soils, their distribution and effects on natural vegetation and cultivated plants; general characteristics of the forests and their economic products; the distribution of animals; the distribution of minerals and the sources of mechanical power, their relationships to the industrial activities; localisation of manufacturing, mining, and other industries; important international and interprovincial trade routes; sites and functions of some important cities.

#### Paper II—Principles of Human and Physical Geography—

A thorough knowledge of the fundamental principles of Human and Physical Geography to form a basis for the study of Regional Geography.

In addition to a fuller treatment of the subjects included in the Intermediate Course the following:—

The environment as the physical basis of the life of various human groups, with special reference to India; modification of natural landscape by human agencies; the effects of the industrialisation of the world upon the distribution of population.

The earth's crust—the properties of the chief rock-forming minerals and mineral fertilizers; classification and general properties of the chief types of rocks; their modes of origin, and structures due to folding and faulting; processes of denudation



and deposition; soil formation and soil type; development of river systems; the cycle of erosion; general characters of the chief types of topography.

Wave and tidal movements and their effects; origin and effects of ocean circulations.

### *Practical*

(a) Cartographical representation of meteorological and economic data.

(b) Interpretation of weather and climatic maps.

(c) Construction of maps on some simple projections used in a standard atlas.

(d) Surveying.—Simple methods of surveys including the use of plain-table and prismatic compass.

(e) Interpretation of Topographical Maps ( $\frac{1}{4}$ ",  $\frac{1}{2}$ ", 1", maps) of some natural regions of India, and simple geological maps of India showing horizontal beds and simple folds.

(f) Megascopic examination of chief rock-forming and economic minerals, and the chief types of igneous, sedimentary and metamorphic rocks.

(g) Identification of principal cereals and fibres of India.

(h) Geographical Excursions.—Students must take part in geographical excursions arranged by the authorities.

## HONOURS COURSE

### *Theoretical*

*Papers I and II*—General Regional Geography—

*Paper I*—(a) India and the Monsoon Lands of Asia.

(b) One of the following areas of India (other areas may be prescribed by the Syndicate from time to time):

The Kumaon Himālaya, the Meghālaya and the Doab of the Ganges and Jumna.

*Paper II*—(a) Europe with fuller treatment of the British Isles.

(b) One of the following as may be prescribed by the Syndicate from time to time:

North America with special reference to United States.

South America with special reference to Brazil.

Africa with special reference to the territories inhabited by Indian emigrants.

Australasia.

*Paper III*.—Principles of Physical and Human Geography.

## Paper IV—Special Topics—

Two of the following are to be taken (other subjects may be prescribed by the Syndicate from time to time):—

- (a) Climatology.
- (b) River Geography.
- (c) Economic Geography.
- (d) Cartography.
- (e) Political Geography.

*Papers I and II**General Regional Geography*

Natural regions, their relationships to political territories, and their economic importance; group life in various environments; the chief racial and national characteristics; the degree of adaptability to the physical environment; the distribution and influences of various types of rocks on the topographical features in so far as they determine human activities; topographical features determined by climate, form of erosion, and tectonic movements; the river systems; climate and weather types; the influence of the neighbouring seas and oceans on the lands and their inhabitants; soils, their distribution and effects on natural vegetation and cultivated plants; general characteristics of the forests, and their economic products; the distribution of animals; the distribution of minerals and the sources of mechanical power, their relationships to the industrial activities; localisation of manufacturing, mining and other industries; important international and interprovincial trade routes; sites and functions of some important cities.

India and the Monsoon Lands of Asia—India including Burma and Ceylon, Indo-China, Malay Archipelago, China and Japan to be studied. Geographical maps of the International series on the scale of 1: 1,000,000 to be used in connection with the regional geography of India.

The Kumaon Himālaya, the Meghālaya and the Doab of the Ganges and Jumna; a detailed study of the region to be required with the help of 1" Survey maps, and Governmental and other publications. Candidates are expected to study the inter-relations and the evolution of the various physical and biological elements in the geography of the selected area.

Europe, North America or South America or Africa or Australasia. Emphasis to be made on the part played by man in the exploitation and consequent modification of lands in neighbouring areas with a view to obtaining foods, clothing, shelter and luxuries of the civilised life. Comparisons to be made with India, wherever possible.

### *Paper III*

#### *Principles of Physical and Human Geography*

A thorough knowledge of the fundamental principles of Physical and Human Geography to form a basis for the study of Regional Geography.

In addition to a fuller treatment of the subjects included in the Pass Course the following:—

Distribution and differentiation of the human race; characteristics of social groups.

The geographical factors affecting the development of industries and production of raw materials and food-stuffs derived from land and water.

Evolution of chief types of land forms.

Climatic factors leading to a recognition of the chief climate and weather types.

### *Paper IV*

#### *Special Topics—*

##### *(a) Climatology*

Meteorological instruments, their construction and uses; Diurnal, seasonal and annual distribution of the elements of climates, their causes and effects; oscillations of climatic elements, leading to a recognition of weather types; weather conditions of upper air; periodic and aperiodic winds; monsoon, tropical and sub-tropical cyclones, nor'westers, thunderstorms, dust storms and cyclonic storms; conditions of local circulation; different forms of precipitation and their causes; climatic regions; climate and weather types of India in detail.

##### *(b) River Geography*

Topography and drainage; various types of springs, rivers and river valleys; factors affecting the volume of water discharged by rivers; erosion by rivers; river deposits; water power derived from rapids and waterfalls; canals and tanks; river traffic, the part played by rivers in the evolution of human societies; glaciation in relation to river systems of India; study of the life history of the Ganges, Indus and Brahmaputra; changes in the courses of Indian rivers during historic times; river problems in Bengal.

##### *(c) Economic Geography*

A fuller treatment of the geographical factors affecting the production of raw materials and food-stuffs derived from land and water, their home consumption and export; manufacturing industries; the development of power resources; the transport

and marketing of commodities. Tea, jute and cotton to be treated in some detail as examples in agricultural, commercial and industrial geography. The economic geography of India to be treated in some detail.

#### (d) *Cartography*

The construction and uses of the following instruments of survey:—Prismatic compass; level, sextant, and theodolite; contours and traverse; simple treatment of geodetic and photographic surveying; a fuller treatment of map projections.

The study and interpretation of large scale topographical maps issued by the Survey of India. Some reference to be made to issues of British Ordnance Surveys and French Service Geographique de l'Armée.

Collection of data on climatology, economic and human geography, and their cartographical representations.

#### (e) *Political Geography*

The geographical position of the lands of the chief States, their people, frontiers and capital cities; a fuller treatment of the geographical background of modern socio-political problems; the development of Colonial Powers with the settlement of new lands; types of British colonisation, and the part played by Indians in the development of the British Commonwealth.

### *Practical*

#### *Paper I—(a) Surveying.*

##### (b) Identification of rocks, minerals, plants and cereals.

Surveying.—Methods of survey, including the use of the chain, plane-table and prismatic compass; levelling; the determination of horizontal and vertical distances with the help of the theodolite.

Rocks, Minerals, Plants and Cereals.—Examination of the principal rock-forming and economic minerals, and principal sedimentary, igneous and metamorphic rocks; identification of typical plants and cereals.

#### *Paper II—Map work.*

##### (a) Interpretation of topographical, climatological and geological maps.

The interpretation of large scale maps and of topographical maps of the International series of some typical regions of the world; also interpretation of simple geological maps. Climatic and economic maps drawn from data published in the Memoirs of the Indian Meteorological Department and other scientific departments.

(b) Map projections—Drawing of maps on simple projections.

(c) Preparation of geographical maps from original sources of the area selected in the theoretical paper [Paper I (b)].

*N.B.*—The Laboratory note-books of the candidates shall be inspected and marked by examiners. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

## STATISTICS

### PASS COURSE

The subject will be treated mathematically as far as the Mathematics of the Intermediate Course are applicable.

#### *Theoretical*

Compilation and classification of data. Graphical representation and interpretation of charts and diagrams. Smoothing of data. Trends and fluctuations. Method of moving averages. Method of least squares. Line of best fit. Graduation by a second degree parabola. Interpolation. Elements of the theory of probability. Addition and multiplication theorems.

Concepts of statistical populations and random samples. Histograms and frequency charts. Method of Moments. Mean, Median, Mode. Quartile, decile, percentile, range, quartile difference, mean difference, standard deviation. Normal, Poisson and Binomial distributions. Non-normal distributions.

General ideas of association, contingency and correlation. Contingency tables. Tests of independence. Chi-square test. Co-efficient of correlation and its significance. Regression equations. Partial and multiple correlation for three variates. The use of the probability integral. Standard and probable errors. Goodness of fit. Tests of significance. Analysis of variance.

Contents of important Indian statistical publications. Interpretation of economic and business statistics. Construction and use of Index numbers. Trade statistics. Trends, seasonal and cyclic variations. Census. Distribution of population by sex, age, occupation, etc. Intelligence and achievement tests. Application of statistics in agriculture and industry. Design of experiments. Replication. Randomization. Sampling surveys. Preparation of schedules and forms for enquiries.

#### *Practical*

Scrutiny of data and reconciliation of discrepancies. Tabulation and classification of statistical data. Graphical representation and interpretation of bar and circular diagrams, time records, histograms, frequency curves and correlation charts.

Simple interpolation. Calculation of arithmetic, geometric and weighted averages. Construction of simple Index Numbers. Simple Nomograms. Preparation of grouped frequency and correlation tables. Calculation of moments up to the fourth order with adjustments for grouping. Calculation of mean, standard deviation, co-efficient of variation and co-efficient of correlation with standard errors. Fitting of normal curve. Use of the probability integral for the normal curve. Tests of significance. Chi-square test. Simple cases of analysis of variance.

Candidates will be expected to be familiar with the use of standard mathematical and statistical tables, slide rules and simple types of calculating machines.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

### HONOURS COURSE

#### *Theoretical*

The subject for the Pass Course will be treated in greater detail with the addition of the following:—

Finite differences and interpolation. Graduation by empirical formulae. Use of polynomial functions. Harmonic and periodogram analysis. Elements of mathematical theory of probability. Inverse probability. Frequency distributions. Principle of maximum likelihood in estimation. Bi-variate normal correlation surface. Partial and multiple correlation for four variates. Special methods for finding correlation. Non-linear regression. Contingency tables. Tests of independence and association. Elements of the theory of sampling distributions. The exact distribution of mean, standard deviation, statistic, ratio of variances, co-efficient of correlation when the population value is zero, and Chi-square statistics. Goodness of fit. Analysis of variance for factorial experiments. Applications of the statistical method in economics, commerce and industry, agriculture, psychology and education, medicine and public health, biology and other experimental sciences. Design of experiments. Representative samples. Technique of sample surveys.

#### *Practical*

In addition to the Pass Course:—

Measurement of areas by planimeter and by graphical methods. Inverse and bi-variate interpolation. Fitting of curves by least square methods. Calculation of secular trend

and seasonal and cyclic fluctuations. Harmonic analysis with 12 ordinates. Fitting of Pearson curves—Types I and III. Use of the Chi-square test. Contingency tables. Multiple regression for three variates. Significance of co-efficients of correlations. Correlation ratio. Non-linear regression. Analysis of variance and co-variance. Use of tables of test criteria. Statistical analysis of actual data.

The Laboratory note-books of candidates shall be inspected and marked by examiners, and if they are found to be unsatisfactory, the candidates will be disqualified. Note-books which have not been signed at frequent intervals by the Professor under whom the candidates worked, will not be accepted.

Students who have passed the Intermediate Examination with Mathematics, Physics and Chemistry may be examined in one of the following *Alternative Honours courses*:—

#### COURSE A

I. Pure Mathematics	.. Two Papers.
II. Applied Mathematics	... Three Papers.
III. Drawing	... One Paper and a Practical Examination.
IV. Physics	... Two Papers and a Practical Examination.
V. Chemistry	... One Paper and a Practical Examination.

*Pure Mathematics* shall include—

- (a) Higher Algebra.
- (b) Higher Plane Trigonometry.
- (c) Vector Analysis.
- (d) Analytical Geometry (Plane).
- (e) Analytical Geometry (Solid).
- (f) Differential Calculus.
- (g) Integral Calculus.
- (h) Differential Equations.

*Applied Mathematics* shall include—

- (a) Statics and Graphical Statics.
- (b) Dynamics of a Particle.
- (c) Elementary Rigid Dynamics.
- (d) Hydrostatics.
- (e) Hydraulics.
- (f) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.

*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat and Technical Thermodynamics.
- (c) Electricity and Magnetism including Electro-mechanics.
- (d) Light.

*Chemistry* shall include a general knowledge of the subject with special reference to—

- (a) Technology of water—Determination of hardness and softening process.
- (b) Fuel—Determination of calorific power of different technical fuels.
- (c) Chemistry of Combustion.
- (d) Lubricating oils—Determination of viscosity, flash point and suitability for different purposes.
- (e) Chemistry of technically important metals with special stress on Iron and Steel.

#### COURSE B

I. Pure Mathematics	... Two Papers.
II. Applied Mathematics	... Two Papers.
III. Drawing	... One Paper including Practical Examinations.
IV. Physics	... Three Papers and two Practical Examinations.
V. Chemistry	... One Paper and Practical Examinations.

*Pure Mathematics* shall include—

- (a) Analytical Geometry (Plane).
- (b) Analytical Geometry (Solid).
- (c) Vector Analysis.
- (d) Differential Calculus.
- (e) Integral Calculus.
- (f) Differential Equations.

*Applied Mathematics* shall include—

- (a) Statics and Graphical Statics.
- (b) Dynamics of a Particle.
- (c) Elementary Rigid Dynamics.
- (d) Hydrostatics.
- (e) Hydraulics.
- (f) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.



*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat.
- (c) Electricity and Magnetism.
- (d) Light.
- (e) Sound.

*Chemistry* shall include—

Physical Chemistry.

Candidates will be expected to possess a knowledge of the general principles of Chemistry.

### COURSE C

- I. Pure Mathematics ... One Paper.
- II. Applied Mathematics ... One Paper.
- III. Drawing ... One Paper including Practical Examinations.
- IV. Physics ... Two Papers and a Practical Examination.
- V. Chemistry ... Three Papers and three Practical Examinations.

*Pure Mathematics* shall include—

- (a) Analytical Geometry (Plane).
- (b) Analytical Geometry (Solid).
- (c) Vector Analysis.
- (d) Differential Calculus.
- (e) Integral Calculus.
- (f) Differential Equations.

*Applied Mathematics* shall include—

- (a) Hydrostatics.
- (b) Hydraulics.
- (c) Strength of Materials.

*Drawing* shall include—

- (a) Tracing.
- (b) Descriptive Geometrical Drawing.
- (c) Drawing from Models.
- (d) Design of Machine Elements.

*Physics* shall include—

- (a) General Properties of Matter.
- (b) Heat including Thermodynamics of Heat Engines.
- (c) Electricity and Magnetism including elementary principles of Electrical Machines.
- (d) Light.

*Chemistry* shall include—

- (a) Physical Chemistry.
- (b) Inorganic Chemistry.
- (c) Organic Chemistry.

The limits of each subject in each course shall be defined by a detailed syllabus to be drawn up from time to time jointly by the Board of Studies and the Board of Higher Studies concerned. Special stress will be laid on the practical applications of the subjects.

100 marks shall be assigned to each written paper and to each practical examination. In order to pass, a candidate must obtain 30 marks in each written paper, 40 marks in each practical examination, and 400 marks in the aggregate. A candidate who obtains 720 marks shall be placed in the First Class and a candidate who obtains 480 marks shall be placed in the Second Class.

Candidates shall be required to produce Laboratory note-books and other records of regular work during the entire period of study. These will not be accepted and valued unless duly attested and certified by a recognised teacher at regular intervals. Candidates may be questioned orally with regard to the contents of their note-books and other records.

## GENERAL

1. A candidate must obtain, in order to pass in the Pass Course, in—

Mathematics	...	100 marks
Any other subject	...	60 marks in the Theoretical papers. 40 marks in the Practical papers.

2. A candidate must obtain, in order to pass in the Honours Course, in—

Mathematics	...	180 marks.
Any other subject	...	108 marks in the Theoretical papers. 72 marks in the Practical papers.

3. A candidate must obtain, in order to attain the Honours standard, in—

Mathematics	... 240 marks.
Any other subject	... 160 marks in the Theoretical papers. 80 marks in the Practical papers.

4. If a candidate takes up the Pass Course in three subjects, he must, in order to pass the B.Sc. Examination, pass in each subject, and obtain 324 marks in the aggregate. If he passes and obtains 450 marks in the aggregate, he shall be declared to have passed with Distinction.

5. If a candidate takes up the Pass Course in two subjects and the Honours Course in one subject, he must, in order to pass the B.Sc. Examination, pass in each subject, and obtain 432 marks in the aggregate. If he passes and also attains the Honours standard in his Honours subject, he shall be declared to have obtained Second Class Honours in that subject. If he passes, attains the Honours standard in his Honours subject, and obtains 360 marks in that subject, he shall be declared to have obtained First Class Honours in such subject.

6. Any candidate who has failed in one subject only, by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 50% or more in the aggregate of the marks of the examination, shall be allowed to pass. If any such candidate has taken up the Pass Course in three subjects, he shall not be declared to have passed with Distinction. But if the candidate has taken up the Pass Course in two subjects and the Honours Course in one subject, and has attained the Honours standard in such subject, he shall be allowed to retain his Honours and his place in the Honours list.

7. If the Examination Board is of opinion that, in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reasons for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

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## CHAPTER XXXVII

### MASTER OF SCIENCE

1. An examination for the Degree of Master of Science shall be held annually in Calcutta, commencing at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar

Any candidate who has passed the B.Sc. Examination not less than two academical years previously may be examined for the Degree of M.Sc. in any subject mentioned in Regulation 5, provided he has passed the B.Sc. Examination in such subject or in an allied\* subject and has prosecuted a regular course of study for two academical years in a College or Colleges affiliated to the University in respect of that subject and standard, or in the Post-Graduate classes of the University.

Any candidate who has passed the B.Sc. Examination not less than three academical years previously may be admitted as a private student to the M.Sc. Examination in Pure Mathematics and Applied Mathematics subject to the provisions of Section 19 of the Indian Universities Act.

2. † Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 80 to the Registrar not less than three months before the examination. If a student desires to appear in the M.Sc. Examination in Psychology, he shall give the Registrar one year's notice of the fact.

3. Any Master of Science may, on payment of a fee of eighty rupees, be admitted to the M.Sc. Examination in any subject or a group comprised in a subject, other than that in which he was previously examined, provided that if he takes up a subject other than Pure Mathematics and Applied Mathematics, he has passed the B.Sc. Examination in such subject or in an allied\* subject and has prosecuted a regular course of study in that subject for a period of two academical years in a College affiliated to the University in respect of that subject and standard, or in the

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\* N.B.—The Executive Committee of the Council of Post-Graduate Teaching in Arts or Science, as the case may be, will decide which subject is an allied subject.

† Candidates who take up Pure Mathematics and Applied Mathematics shall send in their applications and fees to the Registrar six months before the commencement of the examination.

Post-Graduate classes of the University. He shall, if his attainments come up to the standard prescribed for the Degree of M.Sc., be granted a certificate to that effect, stating the subject and class in which he has passed.

4. A candidate, who fails to pass, or to present himself for examination, shall not be entitled to claim a refund of the fee. A candidate who fails to pass may be admitted to any one or more subsequent M.Sc. Examinations in that subject as a private student on payment of a like fee of Eighty Rupees on each occasion subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

4A. If a student, after completion of a regular course of study for the examination, does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the two following examinations of the same standard on payment of the prescribed fee, provided that he produces, in addition to the ordinary certificate or certificates as required under the Regulations, a certificate from the Head of the Institution at which he studied or from a member of the Senate testifying to his good character during the intervening period, and provided further that in case the student offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

Such a student may appear at any one or more subsequent M.Sc. Examinations in that subject as a private candidate on payment of the prescribed fee subject to the provisions of Section 19 of the Indian Universities Act, provided that in case the candidate offers a science subject for which a practical course is necessary under the Regulations, he also produces a certificate from the Head of the Institution or from some other authority approved by the Syndicate to the effect that he has taken such a course of practical training in his laboratory during the year immediately preceding the examination at which he presents himself.

If a student, after the completion of his regular course of study, registers himself as a candidate at the examination immediately succeeding such completion and appears at the

examination but fails to complete the examination on account of illness or any other reason considered sufficient by the Syndicate the above rules may be applied to the cases of such students by the Syndicate.

5. A candidate may be examined in any of the following subjects:—

- I. Pure Mathematics.
- I-A. Applied Mathematics.
- II. Chemistry.
- II-A. Applied Chemistry.
- III. Physics.
- III-A. Applied Physics.
- IV. Botany.
- V. Physiology.
- VI. Zoology and Comparative Anatomy.
- VII. Geology.
- VIII. Psychology.
- IX. Anthropology.
- X. Statistics.
- XI. Geography.

6. There shall be a practical examination in all subjects other than Pure Mathematics, and candidates in all subjects other than Applied Mathematics shall be required to pass in the practical portion of the examination as well as in the theoretical portion defined in the syllabuses.

In Pure Mathematics there shall be eight papers of four hours each, each carrying 100 marks. In Applied Mathematics and Statistics there shall be 8 full papers carrying total marks of 800 distributed as shown in the syllabus.

In Physics, Geology and Anthropology there shall be five theoretical papers of four hours each, each carrying 100 marks, and the practical examination shall extend over at least three days and shall carry 300 marks.

In Psychology there shall be five theoretical papers of four hours each, each carrying 100 marks, and the practical examination shall extend over at least four days and shall carry 300 marks.

In Botany and Physiology, there shall be five theoretical papers of four hours each, each carrying 80 marks, and the practical examination shall consist of four papers extending over at least four days and shall carry 100 marks each.

In Geography and Zoology and Comparative Anatomy the papers and marks shall be shown in the syllabus.

In all other subjects there shall be four theoretical papers of four hours each and the practical examination shall extend over at least four days. The total marks shall be equally

divided between the theoretical and practical portions of the examination.

6A. A candidate may be permitted to offer a piece of research work in the subject which he has taken up for the M.A. or M.Sc. Examination, and approved by the Executive Committee of the Post-Graduate Council concerned, in lieu of any two papers in Pure Mathematics and Applied Mathematics and in lieu of one theoretical and one practical paper in other subjects, the papers to be so exempted being decided in each case by the Board of Higher Studies concerned, provided that the candidate has passed the B.A. or B.Sc. Examination with Honours in that subject or in a subject approved by the Board in this behalf. The total marks of the papers exempted shall be either 200 or 180 as the case may be.

7. The limits of the subjects shall be as follows:—

### PURE MATHEMATICS

The subjects in *Pure Mathematics* shall be as follows:—

*Paper I.*—Algebra and Arithmetic.

*Paper II.*—Application of Pure Mathematics.

*Paper III.*—Projective Geometry.

*Paper IV.*—Spherical Trigonometry, Metric Geometry and Differential Geometry.

*Paper V.*—Differential and Integral Calculus.

*Paper VI.*—Infinite Series, Differential Equations, Fundamentals of the Theory of Complex Functions.

*Papers VII and VIII.*—Any one of the following subjects:

- (a) Theory of Functions of a Real Variable.
- (b) Theory of Functions of a Complex Variable.
- (c) Theory of Numbers.
- (d) Theory of Groups.
- (e) Finite Differences and Statistics.
- (f) Higher Curves and Surfaces.
- (g) Foundations of Geometry, Non-Euclidean Geometry and Geometry of the Fourfold.
- (h) Quaternions and Vector Analysis.
- (i) Integral Equations with Applications.
- (j) Elliptic Functions and Higher Transcendentals.
- (k) Calculus of Variations.
- (l) Higher Algebra.
- (m) Topology.
- (n) Riemannian Geometry.

The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Higher Studies concerned.

One four-hour paper shall be set upon each of the first six compulsory subjects and two papers on the optional subject.

## APPLIED MATHEMATICS

Candidates in *Applied Mathematics* shall be expected to possess a sound general knowledge of a number of compulsory subjects and a detailed knowledge of selected topics as indicated below:—

1-4. Four theoretical papers of 4 hours each, each carrying 100 marks:—

- |   |     |     |           |
|---|-----|-----|-----------|
| (a) General Mechanics                   | ... | ... | 2 papers. |
| (b) Hydromechanics                      |     | ... | 1 paper.  |
| (c) Analysis and Differential Equations |     | ... | 1 paper.  |

5. One theoretical half paper of  $2\frac{1}{2}$  hours carrying 50 marks and another half paper comprising a practical examination carrying 50 marks in the Theory and Practice of Numerical Calculations including Combination of Observations. The two half papers together shall constitute one full paper.

6. One theoretical paper of four hours carrying 100 marks in two subjects to be selected by the candidates from a number of subjects prescribed by the Board of Higher Studies in Applied Mathematics.

Appended is a list of such subjects which may be added to or modified from time to time by the Board:—

- (a) Theory of Potential.
- (b) Spherical Astronomy.
- (c) Elements of the Theory of Electricity.
- (d) Elements of the Theory of Thermodynamics.

7-8. Two papers in one subject to be selected by the candidates from the following list which may be added to or modified from time to time by the Board of Higher Studies in Applied Mathematics:—

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>(a) Mathematical Theory of Elasticity</li> <li>(b) Electricity and Magnetism</li> <li>(c) Advanced Hydromechanics</li> <li>(d) Geodesy and Geophysics</li> <li>(e) Advanced Dynamics</li> <li>(f) Celestial Mechanics</li> <li>(g) Statistical Mechanics and Thermodynamics</li> <li>(h) Quantum Mechanics and Wave Mechanics</li> <li>(i) Theory of Relativity</li> <li>(j) Probability and Mathematical Statistics (one theoretical paper of four hours carrying 100 marks, one theoretical half-paper of <math>2\frac{1}{2}</math> hours carrying 50 marks and another half paper comprising a practical examination carrying 50 marks—the two half-papers together shall constitute one full paper).</li> </ul> | } | <p>Two papers of<br/>four hours each,<br/>each carrying<br/>100 marks.</p> |
|--|---|--|



## CHEMISTRY

Candidates in Chemistry shall be examined in the following:—

- A. Physical Chemistry.
- B. Inorganic Chemistry.
- C. Organic Chemistry.

They will be expected to show a detailed knowledge of any one of these branches and a general knowledge of the other two.

There shall be a practical examination comprising qualitative and quantitative analysis, and the preparation of chemical specimens.

## PHYSICAL CHEMISTRY (GENERAL)

*Theoretical*

## I. The states of aggregation:—

The Kinetic theory; Avogadro's number; Laws of perfect gases; Maxwell's law of distribution of velocities; actual gases, characteristic equations of gases; theory of corresponding states; gas thermometers; Joule-Thomson effect; graphic representation; liquefaction of gases; specific heats of gases, liquids and solids; diffusion; viscosity; the liquid state; the solid state; characteristic properties of crystals; elementary X-ray analysis of cubic systems.

## II. Thermodynamics and Thermochemistry:—

The first law of thermodynamics; adiabatic and isothermal processes; reversible and irreversible processes; Carnot's cycle; thermodynamic scale of temperature; standard temperatures; law of radiation; measurement of temperature and of energy; changes accompanying chemical reactions and chemical equilibrium; applications of the first law to chemistry; changes of energy of transformation with temperature.

The second law of thermodynamics; internal energy; free energy; entropy, heat function; activity; partial and total heat quantities; efficiency of natural processes; chemical affinity; Clausius and Clapeyron's equation; variation of solubility with temperature; Le Chatelier and Braun's principle of mobile equilibrium; the Gibbs-Helmholtz equation; the phase rule, chemical and thermodynamic potentials.

## III. Solutions:—

Dalton and Henry's laws; laws of mixtures; partial and total pressure; molar fraction; partial molar quantities; theory of dilute solutions; osmotic pressure and its measurement; the determination of molecular weights; Kirchhoff's relation; theory

of fractional distillation; Duhem and Margule's equation; properties of membranes; solid solutions.

#### IV. Chemical equilibria:—

Measurement of equilibrium constant; effect of temperature and pressure; reaction isotherm and reaction isochore; detailed study of typical examples of homogeneous equilibria in gaseous, liquid and solid systems; heterogeneous equilibrium; simple phase law diagrams; alloys and their properties, transition points.

#### V. Kinetics of chemical reaction:—

Conditions determining the velocity of chemical reaction; order of reaction; period of induction; intermediate compounds; acceptor and inductor molecules; active molecules; energy of activation; elements of the theories of catalysis; nature of catalysis and their typical application to industry; promoters; poisons; principles underlying Haber's synthesis of ammonia; detailed study of typical gaseous and liquid systems.

#### VI. Electrochemistry:—

Conduction of electricity by electrolytes; outline of the theory of complete dissociation; electrolysis; primary and secondary cells; solution tension of metals; concentration cells; standard electrodes; potentiometric and conductometric titrations; measurement of hydrogen ion concentration; indicators; decomposition potential; electro-analysis; polarisation; capillary electrometer.

#### VII. Colloids:—

Surface tension; methods of measurement; surface energy; degree of dispersion; adsorption of gases and of liquids by solids; preparation and properties of colloidal solutions; electro-dialysis; ultra-filtration; stability; electric charge; hydration; coagulation of colloids; protective action; gold number; the ultra-microscope; Brownian movement; sol-gel transformation; iso-electric point; colloidal electrolytes; emulsions.

#### VIII. Photochemistry:—

Laws of absorption of light; measurement of absorption of light; Einstein's law of photochemical equivalence elements of theoretical and experimental photochemistry.

#### IX. Radioactivity:—

Measurement of radioactivity; radiations from radioactive substances; the disintegration hypothesis; the displacement law; the three disintegration series; isotopes.

#### X. The Atom:—

Elements of the quantum theory.

### *Practical*

Determination of v.d., viscosity, surface tension; electrolytic conductivity; e.m.f. of electrolytic cells; heats of neutralisation and solution; identification of spectral lines; refractive index; electrometric titrations; preparation and properties of colloidal solutions; adsorption; hydrogen ion concentration; velocity of reaction; partition co-efficients; solubility; chemical equilibrium; calibration of a thermocouple (usual types); solubility and cooling curves; phase law diagrams of simple aqueous salt systems; molecular weight determinations; optical rotation; measurement of electrochemical equivalent.

Actual number of experiments will be determined from time to time.

### PHYSICAL CHEMISTRY (SPECIAL)

#### *Theoretical*

In addition to a fuller treatment of the General Course, the following:—

*Solutions*—Solubility, polarity, solvation, internal pressure.

*Electrochemistry*—Liquid junction potential; theory of strong electrolytes; properties of electrolytes in non-aqueous solvents; over-voltage; kinetic salt effect; oxidation reduction potentials; polybasic acids.

*The Quantum theory and atomic structure*—The Quantum theory and its applications to chemistry; the structure of the atom; atomic spectra; valency; non-radioactive isotopes.

*Structure of molecules*—Ionic deformation in relation to theories of valency; dipole moment; polarisation; relation between dielectric constant and refractive index.

*Chemical kinetics*—Chain reactions, typical atomic reactions, ionic reactions, homogeneous and heterogeneous catalysis.

*Photochemistry*—Excitation of atoms and molecules by absorption of light, application of molecular spectra in the study of photochemistry, chain reactions, photosensitisation, photocatalysis and inhibition.

*Thermodynamics*—The Nernst Heat Theorem and its applications.

*Kinetics of chemical reactions*—Classification of chemical reactions, homogeneous and heterogeneous reactions, order of reactions, period of induction, intermediate compounds, acceptor and inductor molecules, active molecules, energy of activation, the mechanism of chemical change. Elements of the theories of catalysis, nature of catalysts and their typical application to industry; promoters, poisons; detailed study of some important industrial reactions in the gaseous and liquid systems.

*Practical*

In addition to more accurate and extended measurements as under the practical course in Physical Chemistry (General), the following:—

Advanced conductometric and electrometric titrations; measurements of (a) extinction co-efficients and snapping of absorption spectra, (b) cataphoretic speeds, (c) transport numbers, (d) transition temperatures, (e) photochemical measurements, (f) heat of formation.

## INORGANIC CHEMISTRY (GENERAL)

In addition to a fuller treatment of the subjects prescribed for the B.Sc. Honours Course, the following:—

*Theoretical*

Double and complex salts, Werner's theory, valency and structure of the atom, radioactivity, general methods of accurate determination of atomic weight, gas analysis and water analysis, application of physico-chemical methods in analysis.

Study of the following elements and their simple compounds:—

Rare gases, beryllium, gallium, indium, thallium, titanium, molybdenum, tungsten, cerium, thorium, zirconium, hafnium, uranium, germanium, vanadium, rhenium, platinum metals; general properties of rare earths and their general methods of separation.

*Practical*

Qualitative analysis of mixtures containing not more than six radicals, positive or negative (in addition to the acid radicals mentioned in the B.Sc. Honours Course, the following:—cyanides, thiocyanates, chlorates and ferrocyanides), excluding the rare elements.

Typical inorganic preparations:—Chrome alum, hydrazine sulphate, barium dithionate, sulphuryl chloride, ceric ammonium nitrate, potassium chlorate, chloro-pentamine, cobaltic chloride, hydroxylamine hydrochloride, aluminium chloride.

Quantitative: Bismuthate and Volhard's method, use of adsorption indicators. Estimation of zinc by ferrocyanide. Analysis of brass, german silver, type metal, steel, haematite, dolomite, chromite, pyrolusite and coal.

## INORGANIC CHEMISTRY (SPECIAL)

In addition to a fuller treatment of the subjects prescribed for the General Course, the following:—

*Theoretical*

Atomic structure on the basis of quantum theory, electronic theory of valency, geo-chemistry, crystal chemistry, phase rule (ternary and quaternary systems), inorganic isomerism and stereo-isomerism, iso-dimorphism, iso- and hetero-polyacids, spectroscopic analysis (qualitative and quantitative), alloys and amalgams, intermetallic compounds.

Fuller treatment of the rarer elements including the rare earths.

*Practical*

Qualitative analysis of mixtures containing not more than six radicals (including rarer elements).

Gas and water analysis.

Preparation:—Typical preparations of the complex salts, nickel carbonyl, chromyl chloride, chromous salts, electrolytic preparations.

## ORGANIC CHEMISTRY (GENERAL)

In addition to the B.Sc. Honours Syllabus dealt in a more detailed way, the following:—

*Theoretical*

Haloid hydrocarbons, organo-metallic compounds of zinc and magnesium, saturated and unsaturated aldehydes and ketones, guanidine and thiourea; aliphatic diamines, dialdehydes and diketones, keto-carbonic acids, dibasic acids; more important monobasic and dibasic unsaturated acids, amino-acids; carbohydrates including arabinose, xylose, galactose, mannose and lactose.

A study of the more important derivatives of benzene, naphthalene and anthracene.

Simpler dyes of the following groups:—Azo, triphenyl-methane, phthalein, rhodamine and anthraquinone.

Furfurane, thiophen and pyrrol; pyridine, quinoline and isoquinoline, pyrimidine and iminazol and their simple derivatives, theobromine, caffeine and uric acid.

Isolation and general properties of the alkaloids.

Coniine, nicotine, adernaline, piperine.

General idea of alicyclic compounds and the following:—

Terpineol and its oxidation products, terpinolene and limonene, terpin and cineol, citral, methylheptenone and geraniol, menthone, menthene and menthol, camphor and borneol.

Isoprene, butadiene and India-rubber.

### *Practical*

- (a) At least ten organic preparations of different types;
- (b) identification of any simple organic compound given singly;
- (c) determination of the equivalent of a base or an acid; estimation of formaldehyde, sugars, phenol, primary amine (by acetylation, nitrogen (Kjeldahl and Dumas), phenylhydrazine and acetone.

## ORGANIC CHEMISTRY (SPECIAL)

In addition to the General Syllabus, the following:—

### *Theoretical*

Unsaturated compounds (hydrocarbons, aldehydes, acids and ketones; saturated and unsaturated di- and poly-basic acids, aliphatic diazo compounds; proteins and polypeptides.

A detailed study of the derivatives of naphthalene, anthracene, phenanthrene, acenaphthene and diphenyl.

Polyhydric alcohols, detailed study of pentoses and hexoses; disaccharides and trisaccharides; polysaccharides (inulin, starch, celluloses and glycogen).

More important synthetic and natural dyes.

Alicyclic compounds and their derivatives.

Tannins and depsides.

Five and six membered heterocyclic compounds.

A detailed study of the more important terpenes and camphors.

Detailed study of alkaloids and synthetic drugs. Haematin and related compounds. Carotene and vitamins. Detailed study of the stereochemistry of carbon and other elements; theories of Organic Chemistry including isomeric changes, molecular re-arrangements and valency.

### *Practical*

Literature preparations, identification of complex organic substances having reactive characteristic groups.

Determination of C, H, N, S and halogens.

Estimation of methoxyl and acetyl groups. Estimation of aldehydes and esters.

Determination of nitro-groups and of unsaturation

Assay of alkaloids.

The two Special papers will be distributed as follows:—

*Physical Chemistry—*

*Paper I.*—Kinetic Theory, Thermodynamics, Chemical equilibria, Kinetics of chemical reactions.

*Paper II.*—Solutions, Electrochemistry, Colloids, Photochemistry, Radioactivity, Structure of atoms and molecules.

*Inorganic Chemistry—*

*Paper I.*—Theories and non-metals.

*Paper II.*—Analytical and metals.

*Organic Chemistry—*

*Paper I.*—Aliphatic, Aromatic, Theories, Synthetic dyes, Stereochemistry.

*Paper II.*—Natural products, Alkaloids, Terpenes, Heterocyclic compounds, Synthetic drugs.

Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

## APPLIED CHEMISTRY

### DISTRIBUTION OF PAPERS

#### *Theoretical*

*Paper I.*—Chemical Technology ... 100 marks.  
(including Organic Technology—50  
and Analytical Chemistry —50)

*Paper II.*—Chemical Technology ... 100 marks.  
(including Applied Physical Chemistry —50  
and Inorganic Technology —50)

*Paper III.*—Chemical Engineering ... 100 marks.

*Paper IV.*—Special Subject ... 100 marks.

*Special subjects (of which one must be taken by the student):—*

1. Applied Bio-Chemistry.
2. Oil Technology (Oils, Fats and Soaps).
3. Silicate Industries (Ceramics, Glass, Enamels, etc.).
4. Therapeutic Chemistry.
5. Colour Chemistry and Dyeing.
6. Tanning.
7. Pigments, Paints and Varnishes.

#### *Practical*

Technological analyses and preparation ... 150 marks  
(Organic —50  
Inorganic —50  
Physical —50)

Special Subject	... 100 marks.
Viva voce on some selected industrial problem other than the special subject studied by the student	... 50 marks.
Drawing	... 50 marks.
Workshop Practice	... 50 marks.

### Syllabus

*Organic Technology (Theoretical).*—Mineral oil, Unsaturated hydrocarbons, Rubber (Synthetic and Natural); Wood distillation, Carbonisation of Coal, Coal gases, Oil industries, Carbohydrate industries, Leather technology, Coal-tar and its distillation, Preparation of intermediates for dyestuffs, Dyes, Synthetic and natural drugs.

*Practical.*—Typical preparations: Nitration, Sulphonation, Halogenation, Acetylation, Esterification, Diazotisation, Qualitative detection, Preparation of industrially important Organic compounds, Quantitative Organic analyses of Sugar, Starch, Cellulose, Coal, Tanning materials, Estimation of Phenol, Cresol, Arsenic in drugs. Assays of Cinchona bark, Nux vomica, Tea, Saponification value, Iodine value, Valuation of Oil Cake, etc.

*Applied Physical Chemistry.*—Units; Thermochemistry; the two laws of Thermodynamics; Gas reactions and catalysis; Liquefaction of gases; Distillation of liquid mixtures; Alloys; Colloids—Soap micelles, enzymes; electro-endosmosis as applied to technical operations. Electrochemistry—Electrodisposition, Electroanalysis, E.M.F. Considerations; Primary and Secondary cells; Electro-thermics, Electric furnaces, Electro-metallurgy, Electrochemical industries (e.g., Alkali-chlorine cells, Electrolytic hydrogen, etc., Electrolytic oxidation and reduction, Electrolysis of fused salts, etc.), Applied Photo-Chemistry including Photo-electric cells.

*Inorganic Technology.*—Principles of Analytical Chemistry, Industrial gases, Manufacture of the common acids (e.g., Sulphuric, Hydrochloric, Nitric and Phosphoric, etc.), Alkali Industry, Preparation of heavy chemicals; Metallurgy; Rare earths; Technology of water.

*Chemical Engineering.*—Power production and its transmission; Flow of heat—Rate of flow, heaters, heat interchangers; driers. Evaporation—Theory, simple vacuum and multiple effect evaporation; film evaporation. Distillation—Steam distillation; fractional distillation, theory of rectification column, Azeotropic distillation; Vacuum distillation. Destructive distillation; Solvent recovery and gas scrubbers. Crushing and Grinding Machineries. Grading and Screening. Mechanical Separation. Fuel furnaces and Pyrometry. Transportation of Solids, Liquids and Gases. Materials used in Chemical Industries and their properties. Design of Plants. Costing.



*Colour Chemistry and Dyeing.*—Textile Fibres—Cotton, Wool, Silk, Artificial Silk, Linen and Jute—their physical and chemical properties. Bleaching, Mercerising.

Natural Colouring matters—Products from distillation of Coal-tar and their purification.

Typical cases of Chlorination, Nitration, Reduction and Sulphonation.

Intermediate Products for Synthetic colouring matters. Mordants and their application.

Synthetic colouring matters—their preparation and constitution; Nitro-, Nitroso-, Azo-, T. P. M., Stilbene, Xanthene, Quinolene, Acridine, Thiazine, Oxazine, Azines, Indigoid, Indanthren, Ciba and Hydron and Sulphur Colours.

Relation between colour and constitution.

Theory of dyeing.

*Practical.*—Examination of Textile Fibres and their identification. Experimental Dyeing and Bleaching and examination of fastness of dyed samples.

Analysis of commercial intermediate products.

Analysis of mordants and other chemicals used in Dyeing.

Analysis of dyestuff on fibres.

Analysis of dyestuff in substance.

Identification of Azo-dyes by reduction.

Estimation of Indigo in Indigo-dyed materials.

Preparation of Intermediates for dyestuff.

Preparation of Synthetic dyes.

*Oil Technology: Mineral Oil (Theoretical).*—

- (a) Statistics.
- (b) Drilling and pumping.
- (c) Distillation of crude Petroleum.
- (d) Preparation of Paraffin.
- (e) Utilisation of gas from Petroleum well.
- (f) Utilisation of Petroleum products.

*Fixed Oil.*—

- (a) Statistics.
- (b) Rendering and refining of oils, fats and waxes.
- (c) Composition.
- (d) Preparation and properties of higher saturated and unsaturated fatty acids.
- (e) Qualitative and quantitative tests.
- (f) Hydrolysis.
- (g) Manufacture of candles.
- (h) Properties of Sodium Salts of fatty acids.
- (i) Manufacture of Soaps.
- (j) Boiled oil.
- (k) Hydrogenation of oil.

*Essential Oil—*

- (a) Statistics.
- (b) Rendering of essential oils.
- (c) General composition of essential oils.
- (d) Synthetic perfumes.
- (e) Study of some typical essential oils.
- (f) Blending.

*(Practical)—*

- (a) Determination of flash point of Petroleum fraction.
- (b) Determination of unsaturation and sulphur in Petroleum products.
- (c) Fractional distillation of Petroleum.
- (d) Rendering of Tallow, Fish oil and Castor oil.
- (e) Qualitative and quantitative tests.
- (f) Separation of solid and liquid acids.
- (g) Catalytic hydrolysis of oils.
- (h) Hydrogenation of oils.
- (i) Analysis of milk, condensed milk, butter and ghee.

*Essential Oils—*

- (a) Assay of typical essential oils.
- (b) Preparation of some synthetic perfumes.

*Pharmaceutics—*

- 1. Raw materials for natural drugs, their assay.
- 2. Natural and Synthetic drugs, Chemiotherapy.
- 3. Enzymes and Vitamins. Hormone.
- 4. Colloidal preparations.
- 5. Synthetic preparations.
- 6. B. P. Methods.
- 7. Analysis of Foods and Drugs.
- 8. Principles of Pharmacy.

*Applied Bio-chemistry*—Theories of Fermentation, Enzymes and their properties; Acetone, Butyl Alcohol and Fermentation of Starch; Activated sludge process and methane hydrogen; Fermentation of cellulose; Lactic acid fermentation; Citric acid fermentation; Butyric acid fermentation; Acetic acid fermentation; Bacteriology; Vitamins; Hormones; Food Chemistry; Elements of Immuno-Chemistry.

*Glass and Silicates*.—Theory of glass formation; Raw materials and their analysis; Analyses of different types of glass; Decolourisers; Colouring agents; the general Layout of a glass factory; Design of a glass melting tank furnace; Fuel plants; Making of glass pots; Blowing machines; Mouth blowing; Plate machine; Sand blasting; Decorative glass; Annealing

furnace (continuous and intermittent); Clay and theories of its formation, varieties of clays, action of heat on clay; Raw materials for porcelain and enamel manufacture, and their formations and proportions; Preparation of raw materials; Porcelain and enamel kilns; the general Layout of plants; Testing of finished products.

Raw materials for cement manufacture, Hydraulic lime; Kilns (continuous rotary fume and kilns); Testing of cement.

*Workshop Practice.*—Lathe, Drilling Machine, Hacksaw, Air Compressor, Oil Engine, Steam Engine, Furnace; Calorific value—Coal, Liquid fuel, Gaseous fuel; Electroplating, Electrolytic Chlorine, Filter press, Evaporation, Distillation, Pulverising.

*Mechanical Drawing*—

1. Fundamental principles of scale drawing and orthographic projection.
2. Sheet No. 1—The helix, spiral spring of square section, Section of screw threads (Whitworth, Sellers, Square and Butters), an approximate square screw, proportion of standard nut, Jam-nut, and bolt heads, Lewis bolt, Eye bolt and spanner.
3. Sheet No. 2—Wall bracket (a proportional design).
4. Sheet No. 3—Plumber-block (measurement drawing) and Footstep or pivot bearing.
5. Sheet No. 4—Machine fastenings: Shaft strength diagram, etc. Shaft key, Shaft coupling and cast iron pulley (proportionate design), diagrams of power transmission by belt gearing and rough sketches of spur, Bevel worm and skew gearing.
6. Sheet No. 5—Engine essentials:—Piston-cross and connecting rod, overhung crank, simple eccentric, "D" valve and steam piston.
7. Sheet No. 6—Industrial machine sketching on graph paper.

## PHYSICS

Candidates in Physics will be expected to possess a sound knowledge of the general principles of the subject including the more fundamental advances made of recent years and a detailed knowledge of a Special selected topic as indicated below:—

Five Theoretical papers shall be set, of which the first three shall cover a general course of Mathematical and Experimental Physics distributed as follows:—

### *Paper I*

Heat and General Physics.

*Paper II*

Light and Acoustics.

*Paper III*

Electricity and Magnetism, Electron Theory of Matter.

*Paper IV*

Modern Physics (Principle of Relativity), Wave Mechanics and Elements of Nuclear Physics.

The detailed syllabus of the subjects mentioned in the first four papers stated above will be framed by the Board of Higher Studies in Physics, which may be modified by the same Board when occasion will arise.

*Paper V*

The fifth paper shall be set on a special topic, of which the candidate is expected to possess a detailed knowledge.

Appended is a list of such topics \* which may be added to or modified from time to time by the Board of Higher Studies in Physics—

- (a) Electrical Communication and Radio.
- (b) X-Rays and Structure of Matter.
- (c) Advanced Optics (including Spectroscopy).
- (d) Advanced Acoustics.
- (e) Astrophysics and Generalized Relativity.
- (f) Nuclear Physics.
- (g) Geophysics.

The Practical examination shall consist of three parts. The first part shall be so conducted as to test the candidate's general proficiency in Physical Experiments and Measurements. The second and third parts shall test his proficiency in Advanced Physical Experiments and his Practical knowledge of the Special subjects offered by him for the fifth theoretical paper.

The Laboratory note-books of the candidates shall carry 20 per cent. of the full marks in Practical papers. They shall be inspected at frequent intervals and marked periodically by the teachers under whom the candidates worked at the different Laboratories. These marks will be considered by Examiners at the time of finally adjusting the marks in each Practical test. If the Laboratory note-books are found to be unsatisfactory, the candidates will be disqualified for the examination. In connection with the Practical examination there shall be also a special *viva voce* examination of the candidate on the subject

\* The following special topic has been added to the list by the Board of Higher Studies in Pure Physics :—Statistical Physics.

of the experiment, which will carry 20 per cent. of the full marks allotted to that question.

## APPLIED PHYSICS

Candidates in Applied Physics will be expected to possess a sound knowledge of the general principles of mechanical and electrical engineering subjects including fundamental advances made in recent years and of application of modern Physics to electrical engineering problems and a detailed and up-to-date knowledge of a special branch of engineering selected by them from amongst the branches indicated below.

They will be examined in five Theoretical and four Practical papers. Three theoretical papers (each of 75 marks) and three practical papers (each of 75 marks) shall be compulsory for all students. The remaining two theoretical papers (of total marks 175) and one practical paper (of total marks 175) shall be on the Special Branch selected by the candidates.

### *Theoretical*

- Paper I*—(a) Applied Mechanics.  
                   (b) Applied Thermodynamics.  
                   (c) Machine Tools and Appliances.
- Paper II*—(a) Electrical Measurements and Measuring Instruments.  
                   (b) Electrical Machines.  
                   (c) Principles of Electrical Communication.
- Paper III*—(a) Power Station Practice.  
                   (b) Transmission and Distribution.
- Papers IV and V*—Special Subject.

Appended is a list of such subjects, which may be added to or modified from time to time by the Board of Higher Studies in Applied Physics.

One of the following Special Subjects to be chosen by the candidate:—

#### (A) *Meter and Instrument Engineering—*

*Paper IV*—Advanced Measurements and Standardisation.

*Paper V*—Design and Specification of Measuring Instruments and Sub-standards.

#### (B) *Line and Radio Communication Engineering—*

*Paper IV*—Communication Systems (including Line and Radio Telegraphy and Telephony Carrier Current Communications, Radio Broadcasting, Engineering Acoustics and Railway Signalling).

*Paper V*—Design and Specification of Communication Apparatus and Equipments and simpler projects relating to Telephone and Radio systems.

(C) *Power Engineering*—

*Paper IV*—Power-station Operation and Transmission and Distribution systems.

*Paper V*—Design and Specification of Electrical Machines and Transmission systems.

(D) *Industrial Engineering (Group A)*—

*Paper IV*—Applied X-ray.

*Paper V*—Applied Spectroscopy.

(E) *Industrial Engineering (Group B)*—

*Paper IV*—Lubrication.

*Paper V*—Refrigeration and Air Conditioning.

(F) *Industrial Engineering (Group C)*—

*Paper IV*—Electro-thermic Appliances.

*Paper V*—Illumination Technology.

The detailed syllabus of the subjects mentioned in each of the above five papers will be framed by the Board of Higher Studies in Applied Physics and may be modified by the same Board when occasion will arise.

### *Practical*

*Paper I* Drawing (including Machines, Instruments and Communications Drawing).

*Paper II*—Electrical Measurements and Standardisation.

*Paper III*—Electrical Machines, Machine Tools and Workshop Practice.

*Paper IV*—Special subject:—

(a) Practical Test.

(b) Design and Project works.

Candidates are required to submit at least one complete design of an instrument or appliance; or, one complete project, or, a record of an investigation relating to the Special subject selected by them.

They must also produce certified laboratory record which shall be taken into account in estimating their qualifications. If desired, they may be asked to appear at either *viva voce* or practical test or both on the design and project work or record of investigation submitted by them.

## BOTANY

Candidates in Botany shall be examined in—

- (1) Thallophyta, Bryophyta and Plant Diseases.
- (2) Pteridophyta, Gymnosperms and Fossil Botany.
- (3) Angiosperms and Geographical Botany.
- (4) Physiology, Ecology, Theories of Evolution and Heredity.
- (5) A special topic, of which the candidate is expected to possess a detailed knowledge

The following is a list of such topics which may be added to or modified from time to time by the Board of Higher Studies in Botany:—

One of the following subjects—

- (a) Cytology and Plant Breeding.
- (b) Ecology and Plant Geography.
- (c) Comparative Morphology and Organography.
- (d) Plant Pathology.
- (e) Economic Botany.
- (f) Palaeobotany.
- (g) Plant Physiology.

The practical examination shall include (a) the making of microscopic sections of plants or parts of plants including staining and application of micro-chemical reagents; (b) examination, description and identification of microscopic preparations provided by the Examiners or made by the candidates; (c) examination, description, systematic determination and identification of plants or parts of plants; (d) the performance of physical or chemical experiments, or the setting up and description of apparatus, relating to the physiology of plants.

Candidates must produce note-books of their laboratory work which must be duly certified by the Professor, and shall be taken into account in estimating their qualifications.

Five theoretical papers shall be set under the above heads, one under each. Each paper shall be of four hours' duration and shall carry 80 marks. The practical examination shall be conducted by four papers, each carrying 100 marks.

## PHYSIOLOGY

Candidates in Physiology will be expected to possess a sound knowledge of the general principles of the subject including the more fundamental advances in Physiology made in recent years and a detailed knowledge of the special subjects, theoretical and practical, selected by the candidate for a more searching examination as indicated below.

Five theoretical papers shall be set as follows:—

*Paper I*

General Physiology and Bio-physics of circulation, respiration, alimentation, excretion and reproduction.

*Paper II*

Bio-chemistry, physiological application of energetics, surface action, disperse system, permeability of membranes and the properties of the surface of cells, osmotic pressure, electrolytes and their action. H-ion concentration, Donnan equilibrium, enzymes, hormones and vitamins, carbohydrates, lipides, proteins, digestion, metabolism, dietetics, oxidation and reduction, chemistry of blood and other tissue fluids, chemistry of respiration, excretion and reproduction, specific immunological reactions.

*Paper III*

Nervous system and Endocrine organs.

*Paper IV*

Sense-organs and Nerve-muscle Physiology.

*Paper V*

(SPECIAL PAPER)

(This shall be set on subjects included in one or other of Papers II, III and IV and shall be of a more searching test.)

The practical examination in Physiology shall include (1) Bio-chemistry, (2) Histology, (3) Experimental Physiology or Bio-physics, (4) Special subject (for this the candidate shall name one of the above subjects in which the test shall be more searching than in the others).

Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

## ZOOLOGY AND COMPARATIVE ANATOMY \*

\* The candidate must be prepared to submit himself to a thorough examination in Zoology. He shall name a group of animals, of which he has made a special study and in respect of which the examination will be more searching than in the rest.

The practical examination shall include dissection, microscopical examination and description of types selected out of the group of animals referred to above. The candidate must be

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\*For revised syllabus and courses of study in the subject, *vide* Appendix G.



prepared to show his practical acquaintance with histological and embryological technique.

Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

## GEOLOGY

1. Candidates who offer themselves for examination in Geology for the M.Sc. Degree may elect to specialize in either—

- (a) The Mineralogical and Petrological branch, or
- (b) The Stratigraphical and Palæontological branch.

2. In Geology there shall be five theoretical papers, each carrying 100 marks, distributed as follows:—

### *Paper I*

Economic Geology.

### *Paper II*

Petrology and Mineralogy.

### *Paper III*

General Geology and Palæontology.

### *Paper IV*

Indian Stratigraphy.

### *Paper V*

The fifth paper shall be set on one of the following special topics, of which the candidate is expected to possess a detailed knowledge:—

- (a) Coal.
- (b) Igneous rocks.
- (c) Metamorphic rocks.
- (d) Some selected topics of Palæontology.

The above list may be added to or modified from time to time by the Board of Higher Studies in Geology.

The practical examination shall carry 300 marks, of which 100 shall be in connection with the special paper.

3. All candidates will be expected to show a knowledge of the history of Geological Science, and to possess an intimate acquaintance with the economic aspects of the branch in which they elect to be examined, with special reference to the mineral deposits of India, their exploitation by indigenous methods in the past, and a knowledge of recent developments.

4. Candidates must produce note-books of their practical work, including field-work in which they participated. These must be duly certified by the teacher, and shall be taken into account in estimating their qualifications.

## PSYCHOLOGY

1. The examination shall consist of the following parts:—

### *Theoretical*

#### *Paper I*

General Psychology.

#### *Paper II*

Physiological Psychology.

#### *Paper III*

Abnormal Psychology.

#### *Paper IV*

Genetic Psychology.

#### *Paper V*

One of the following—

- (i) Educational Psychology.
- (ii) Industrial and Vocational Psychology.
- (iii) Advanced Abnormal Psychology.
- (iv) Indian Psychology.
- (v) Social Psychology.

The above list may be added to or modified from time to time by the Board of Higher Studies in Psychology.

### *Practical—Three papers (four days)*

(1) (i) Sensation; (ii) Feeling, Emotion; (iii) Perception; (iv) Attention; (v) Memory, Association; (vi) Action; (vii) Physical and Mental work; (viii) Thought, Will; (ix) Mental Tests; (x) The Unconscious, Dream-analysis, Hypnosis; (xi) Experiments in Animal and Child Psychology.

(2) Every candidate shall also be required to choose in consultation with the Head of the Department of Psychology, a special problem on which he shall carry on intensive experimental work for at least one year under the guidance of a teacher to be nominated by the Board of Higher Studies in the subject. This piece of special work will be examined by the Board of Examiners at the time of the final examination.

(3) The candidates must produce note-books of their laboratory work, which shall be duly certified by the teachers concerned, and shall be taken into account in estimating the candidates' qualifications.

The distribution of marks for the practical examination shall be as follows:—

Special work chosen	...	...	80 marks.
Laboratory note-books	...	...	20 marks.
Other examinations	...	...	200 marks.

Students must possess a working knowledge of the principles and applications of statistical methods.

The limits of the subjects shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Psychology.

## ANTHROPOLOGY

The course in Anthropology shall include both Physical and Cultural Anthropology. Physical Anthropology shall be studied from the zoological, palæontological, physiological, psychological and ethnological points of view. Cultural Anthropology shall be studied from the archæological, technological, sociological, linguistic and ethnological points of view. The entire subject shall be treated with special reference to Indian conditions and problems, past and present. Candidates shall be expected to possess a general knowledge of such subsidiary subjects as archæology, human anatomy, geography, psychology, zoology, physiology, statistics with special reference to biometrics, in so far as such acquaintance is necessary for the proper understanding of anthropology; but they shall not be required to pass a special examination in the subsidiary subjects.

This course shall be as follows:—

*Theoretical*—5 papers (100 marks each)—

### *Paper I*

Comparative Anatomy of the Primates. Human Palæontology. Evolution.

### *Paper II*

Racial Somatology. Anthropology. Racial Pre-history.

### *Paper III*

Evolution of Culture including Prehistory and Material Culture of Primitive peoples.

*Paper IV*

Primitive Society and Religion.

*Paper V*

## GROUP A

Human Heredity and Racial Hygiene. Biometry.

## GROUP B

Advanced Social Anthropology. Intensive study of some Primitive Tribes.

## GROUP C

Culture Analysis of higher elements in Indian Society. Intensive study of some Castes.

*Practical*—3 papers (100 marks each)—

*Paper VI*

Human Osteology. Somatometry. Craniometry.

*Paper VII*

Prehistoric Archaeology. Technology. General Field Work.

*Paper VIII*

Advanced Group Practical (and Pre-history).

## GROUP A

Osteometry. Primate Osteology. Fossil men.  
Typical Pleistocene fossil mammals.  
Preservation of bones.

## GROUP B and GROUP C

Technology, with special reference to the material culture of the Tribe (Group B) or Area (Group C) to be studied. Museum Methods. Field work to collect cultural data.

Detailed syllabuses will be prescribed and books recommended from time to time by the Board of Higher Studies concerned, so as to indicate the extent and standard of knowledge required.

## STATISTICS

1. The course in Statistics shall be divided into a number of groups. The first four papers of each group shall be identical

and shall consist of three written papers, each of four hours and each carrying 100 marks and a practical examination (extending over at least one day) carrying 100 marks.

*Papers I and II*

General Methods of Statistics.

*Paper III*

Applied Statistics.

*Paper IV*

Practical Examination.

2. The remaining four papers shall be taken from any one of the following groups:—

GROUP A

Mathematical Statistics.

GROUP B

Economic and Business Statistics.

GROUP C

Applied Statistics.

In each group there shall be two written papers of four hours each, each carrying 100 marks and a practical examination carrying 200 marks but in the case of Group A (Mathematical Statistics) the candidates shall have the option of taking two papers in Mathematics approved by the Board of Higher Studies in Statistics in lieu of the practical examination.

3. Candidates must produce note-books of their laboratory work, which must be duly certified by the Professor and shall be taken into account in estimating their qualifications.

4. The list of groups may be added to or modified from time to time by the Board of Higher Studies in Statistics. The detailed distribution of papers in each group shall be settled time to time by the Board of Higher Studies in Statistics.

5. The syllabus for each paper shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Statistics to indicate generally the extent and standard of knowledge required.

## GEOGRAPHY

The course in Geography shall be as follows:—

*Paper I*

Geomorphology and Climatology ... 100 marks.  
 [Candidates who have passed the B.A. or B.Sc. (Honours) Examination in Geography with Climatology as a special topic will have to offer Oceanography in lieu of Climatology.]

*Paper II*

Principles of Plant, Economic and Human Geography ... 100 marks.

*Paper III*

Regional Geography of India and adjoining countries with a fuller treatment of one small region—(the region to be prescribed from time to time by the Board of Higher Studies in Geography) ... 100 marks.

*Paper IV*

Regional Geography of not less than *two* selected areas not included in Paper III (the areas to be prescribed from time to time by the Board of Higher Studies in Geography) ... 100 marks.

*Papers V and VI*

One of the following special subjects either from Group A or from Group B:— ... 200 marks.

## GROUP A

*Geology—*

Part I. Structural and Economic Geography.  
 Part II. Geology of India.  
 Practical.

*Cartography—*

Part I. Surveying and Map Making.  
 Part II. Map projections and Surveying instruments.  
 Practical.

*Meteorology—*

Part I. Principles of Meteorology.

Part II. Weather conditions in selected regions.

Practical.

*Pedology—*

Part I. Properties of soil and their distribution; Soil Erosion.

Part II. Utilisation of Land; Natural and cultivated Vegetation.

Practical.

(Each part in each subject shall carry 75 marks and the Practical examination 50 marks.)

## GROUP B

*Cultural Landscape—*

Part I. Roads, Railways and Waterways; Irrigation.

Part II. Human Settlements—villages, towns and markets.

Practical.

*Historical Geography—*

Part I. Historical Geography of one selected country (the country to be prescribed from time to time by the Board of Higher Studies in Geography).

Part II. History of Geographical Knowledge and Explorations.

Practical.

*Political Geography—*

Part I. Principles of Political Geography.

Part II. Political Geography of one selected region (the region to be prescribed from time to time by the Board of Higher Studies in Geography).

Practical.

(Each part in each subject shall carry 75 marks and the Practical examination 50 marks).

[The list of Special subjects may be added to or changed from time to time by the Board of Higher Studies in Geography]

*Practical**Papers VII and VIII*

Surveying and construction of maps, charts and diagrams. Interpretation of topogra-

phical and geological maps. Identification of raw and fabricated materials 200 marks.

Candidates must produce Note-books of their Laboratory work and Field work, which must be duly certified by the Professor. The Note-books shall be examined and marked by the Examiner. 50 marks out of the 200 marks assigned for Practical examination under Papers VII and VIII shall be allotted to these Note-books.

The syllabus for each paper shall be defined and books shall be recommended from time to time by the Board of Higher Studies in Geography to indicate generally the extent and standard of knowledge required.

### GENERAL

8. (a) In order to pass in Pure Mathematics a candidate must obtain 288 marks. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks, those marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(b) In order to pass in Applied Mathematics a candidate must obtain 288 marks. No minimum pass marks shall be required in each paper, but if in any paper a candidate obtains less than 25 marks those marks shall not be included in the aggregate, provided, however, that if any candidate obtains not less than 30 per cent of the marks in the practical portion of the examination in a paper, all marks in that paper shall be included in the aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(c) In order to pass in any subject other than Pure Mathematics, Applied Mathematics, Physics, Botany, Physiology, Geology, Psychology, Statistics, Geography and Zoology and Comparative Anatomy a candidate must obtain 132 marks in the aggregate of the four theoretical papers and 160 marks in the practical examination. If in any theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(d) In order to pass in Physics, Geology, Psychology, and Anthropology a candidate must obtain 165 marks in the aggregate of the five theoretical papers and 120 marks in the practical examination. If in any theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.



(e) In order to pass in Botany, Physiology and Zoology and Comparative Anatomy a candidate must obtain 132 marks in the aggregate of the five theoretical papers and 160 marks in the practical examination. If in any theoretical paper a candidate obtains less than 20 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(f) In order to pass in Statistics a candidate must obtain 165 marks in the aggregate of the five theoretical papers and 40 marks in the compulsory practical examination in compulsory subjects (Paper IV) and 80 marks in the practical examination in the optional subjects or 66 marks in the two papers in Mathematics. If in any theoretical paper a candidate obtains less than 25 marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

(g) In order to pass in Geography, a candidate must obtain 33% of the aggregate marks prescribed for theoretical papers and 40% of the marks set apart for the practical examination. If in any theoretical paper a candidate obtains less than 25 per cent. marks, these marks shall not be included in his aggregate. Candidates obtaining 360 marks shall be placed in the Second Class and those obtaining 480 marks in the First Class.

9. As soon as possible after the examination the Syndicate shall publish a list of candidates who have passed in each subject arranged in three classes and in order of merit. Candidates shall be bracketed together, unless the Examiners are of opinion that there is clearly a difference in their merits.

Each successful candidate shall receive with his Degree of M.Sc. a certificate setting forth the subject in which he was examined, and the class in which he was placed.

10. The candidate, who is placed first in the First Class in each subject (comprising groups, if any), shall receive a Gold Medal and a prize of books to the value of Rs. 200, and the candidate who is placed second in the First Class in each subject (comprising groups, if any), shall receive a Silver Medal and a prize of books to the value of Rs. 100. In subjects (comprising groups, if any) common to both the M.A. and the M.Sc. Examinations, the medals and prizes shall be awarded on the combined results of the M.A. and M.Sc. Examinations:

Provided that the Gold or Silver Medal shall not be awarded to the candidate if he does not secure First Class marks in the aggregate in the common papers in the subject.

The candidate who obtains the highest number of marks in each group comprised in a subject and has been placed in the First Class shall receive a prize of books to the value of

Rs. 100 provided he has not obtained any medal or prize under the preceding clause.

11. In all cases where a candidate is allowed to substitute a piece of research work for part of the examination the following conditions shall be observed:—

- (a) He must have completed one year's study including a full course in the subject in which he intends to offer a piece of research work.
  - (b) He must at the end of the year in question submit to the Syndicate an application for permission to offer a piece of research work in lieu of part of the examination.
  - (c) The application shall indicate the particular piece or research which he wishes to take up and must be recommended by the professor or professors under whom he has been working.
  - (d) If the application be granted by the Syndicate the research must be carried on under the direction of the professor or professors with whom the candidate is prosecuting his studies.
  - (e) The candidate shall draw up a complete report of the particular research work done by him and shall deliver this report to the Registrar at least a month before the first day of the M.Sc. Examination at which he intends to present himself.
  - (f) Every candidate submitting a thesis at the M.A. (Science) or M.Sc. Examination shall be subjected to a *viva voce* examination on the thesis with a view to testing his acquaintance with any previous work that has been done in the particular line of research taken up by him. The *viva voce* examination shall be jointly conducted by the Internal Examiner and one of the External Examiners appointed to examine the thesis; and 25 per cent. of the marks allotted to the thesis shall be set apart for the *viva voce* examination of the candidate.
  - (g) Every candidate submitting a thesis at the M.A. (Science) or M.Sc. Examination and appearing at one or more practical papers must in order to pass in the practical examination obtain at least 40 per cent. marks on the average of the total marks assigned to the practical examination.
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## CHAPTER XXXVIII

### DOCTOR OF SCIENCE

1. Any Master of Science of the University of Calcutta, may offer himself as a candidate for the Degree of Doctor of Science, provided three years have elapsed from the time when he passed the examination.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Science, upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed treating scientifically some special portion of the subject so stated, embodying the result of research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself or of new relations of facts observed by others or tending generally to the advancement of science. The candidate shall indicate, generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and, in what respects his investigations appear to him to tend to the advancement of science.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the science professed by him, or any cognate branch of science, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Science or two Doctors of Science shall have testified, to the satisfaction of the Syndicate, that in habits and character, the candidate is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 200. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contributions, if any, mentioned in Regulation 3, shall be referred by the Syndicate to a Board of three Examiners.

7. If the thesis is approved by the Board, and, if the candidate has obtained a First Class at the examination for the Degree of Master of Science, he shall not be required to submit to any further written examination; but he may be required by the Board, at their discretion, to appear before them to be tested orally or practically, or by both these methods, with reference to the thesis, and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any, and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of science.

8. If the candidate is a person who has obtained a Second or a Third Class at the examination for the Degree of Master of Science, and if his thesis is approved by the Board he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods, with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the written examination, and also of the oral and practical examinations, if any, and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science, they shall cause his name to be published, with the subject of his thesis, and the title of his published contributions (if any) to the advancement of Science.

9. In the case of a candidate obtaining a Second class at the examination for the Degree of Master of Science and falling under the preceding regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of science, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the written examination, he may be exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University and signed by the Vice-Chancellor shall be delivered at the next Convoca-

tion for conferring Degrees to each candidate who has qualified for the degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University, with the inscription: "Thesis approved for the Degree of Doctor of Science in the University of Calcutta."

## CHAPTER XXXVIII-A

### CERTIFICATE IN TANNING

1. An examination for the Certificate in Tanning shall be held annually in Calcutta and such other places as shall, from time to time, be appointed by the Syndicate, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination provided he has fulfilled the following conditions:—

(a) That he has passed the Intermediate Examination with Physics, Chemistry and Mathematics and preferably with Botany or Zoology or Biology as an additional subject.

(b) That he has completed, since passing the Intermediate Examination in Science, a regular course of study, both theoretical and practical, in the subjects for the examination, for three academical years in any institution affiliated to, or recognised by, the University for this purpose:

Provided that candidates who have passed the B.Sc. Examination with Chemistry may be exempted from attending lectures and practical work in Elementary Chemistry but they shall attend lectures on Tannins, their qualitative tests, classification and elementary notions of the constitution of Gallo-tannic acid.

3. Every candidate, sent up for the examination, shall produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the periodical examinations of the Institution and other tests and (d) of probability of passing the examination. Every candidate shall send in his application with a certificate in the form prescribed by the Syndicate to the Registrar at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 25 shall be forwarded by each candidate with his application. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or appear at the examination may be admitted to one or more subsequent examinations for the Certificate in Tanning on payment of a like fee of rupees twenty-five on each occasion provided he produces a certificate from the head of the Institution concerned, showing that he has prosecuted a regular course of

study for one academical year in each of the subjects in which he is to be examined during the year immediately preceding the examination at which he presents himself.

5. The examination shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

6. The subjects of the examination for Certificate in Tanning shall be:—

- (i) Principles and Methods of Leather Manufacture.
- (ii) Analytical Chemistry of Leather Manufacture.
- (iii) Elementary Chemistry.
- (iv) Elementary Microscopy and Bacteriology of Leather Manufacture.
- (v) Leather Trades Engineering.
- (vi) Elementary Book-keeping.

7. The examination shall be written and practical.

There shall be three theoretical and four practical papers in Principles and Methods of Leather Manufacture, two theoretical and two practical papers each in Analytical Chemistry of Leather Manufacture, Elementary Chemistry, Elementary Microscopy and Bacteriology of Leather Manufacture, and Leather Trades Engineering, and one theoretical paper in Elementary Book-keeping.

8. Each theoretical paper shall be of three hours and shall carry 50 marks. Each practical paper shall carry 50 marks. Ten per cent. of the marks in the practical paper shall be set apart for laboratory and tannery note-books.

9. The examination shall be conducted on the lines of the syllabus to be drawn up from time to time by the Syndicate on the recommendation of the Board of Higher Studies in Applied Chemistry. The Paper-setters and Examiners shall also be appointed on the recommendation of the Board. The Board of Higher Studies in Applied Chemistry shall consult the heads of affiliated Institutions before submitting its recommendations regarding syllabus of studies and appointments of Paper-setters and Examiners. The Syndicate shall also appoint one Examination Board to consider the result and report the same to the Syndicate for confirmation.

10. Candidates will be required to pass in the practical as well as in the theoretical portions of the subjects as defined in the syllabus.

11. As soon as possible after the examination the Syndicate shall publish a list of the candidates who have passed, arranged in three classes, each in order of merit. Each successful candidate shall be given a Certificate in the form prescribed in Appendix A.

12. In order to pass the examination, a candidate must obtain 33 per cent. of the marks in each subject. Candidates obtaining 45 per cent. of the aggregate marks shall be placed in the Second Class and those obtaining 60 per cent. in the First Class.

13. Any candidate, who has failed in one subject only and by not more than 5 per cent. of the full marks in that subject and has shown merit by gaining 50 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

14. If the Examination Board is of opinion that in the case of any candidate not covered by the preceding regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, it shall forward the case to the Syndicate with a definite recommendation and the reason for such recommendation. The Syndicate may accept the recommendation or may refer the matter back to the Board for reconsideration.

15. The limits of the different subjects for both theoretical and practical are given below. Books shall be prescribed or recommended when necessary by the Board of Higher Studies in Applied Chemistry.

#### (i) PRINCIPLES AND METHODS OF LEATHER MANUFACTURE

##### *Theoretical*

Course:—History of tanning industry. Histology and structure of hides and skins. Chemical constituents of hides and skins, hide proteins and their chemical behaviours to acids, alkalies, enzymes and to tanning materials. Different kinds of hides and skins. Different breeds of cattle, sheep and goats in India and the characteristic differences of hides and skins obtained from them. Cure and preservation of hides and skins. Tannery waters, their chemical and bacteriological properties. Methods of softening water and water-softening plants.

*Soaking*.—Soaking of green, wet-salted, dry-salted and dry hides. Putrid soaks. Soaking agents.

*Depilation*.—Depilation by sweating and by liming. Use of sodium and arsenic sulphides in depilation. Objects of liming.

Methods of unhairing, fleshing by hand and machine. Different types of unhairing and fleshing knives and beams and of unhairing and fleshing machines. Splitting of hides and skins and different types of splitting machines. Rounding of hides.

*Deliming*.—Objects of deliming. Chemical and fermentative methods of deliming. Characteristics of natural bates.



Manufacture of artificial bates. Different commercial bates and their uses. Processes of bating, puering and drenching and the objects of each. Scudding after delining.

*Pickling.*—Objects of pickling. Chemicals used and their effects on the pelt. Process of pickling for exporting pickled hides and skins and pickling before chrome tanning.

*Tanning.*—Object of tanning and principles underlying the conversion of raw hides and skins into leather. Different processes of tanning.

*Alum tanning or Tawing.*—Its principles and methods of manufacturing various kinds of commercial leather by the process, *e.g.*, calf kid, glove kid, white leather and alum dressing of fur skins.

*Formaldehyde tanning.*—Its principles and methods of manufacturing leather by the process.

*Oil tanning.*—Its principles and methods of making oil-tanned chamois leather. Method of making chamois leather by a combined formaldehyde and oil tannage.

*Chrome tanning.*—Principles underlying chrome tannage. Two-bath and one-bath chrome tannages, their chemistry and practical methods of carrying out. Methods of manufacturing different varieties of commercial chrome leather, *e.g.*, (1) Box and Willow sides, Box and Willow calf, (2) Glacé kid, (3) Chrome sole, (4) Chrome picking band and lace leather, (5) Chrome belting leather.

*Vegetable tanning.*—Vegetable tanning materials, their sources, tannin contents, tanning properties and principal characteristics. Grinding and extraction (*i.e.*, leaching) of tanstuffs for use in vegetable tanning. Manufacturing of tannin extracts. Manufacture and use of synthetic tannin. Manufacture of various kinds of Heavy Dressing and Light leathers by vegetable tanning process, *e.g.*, sole, belting, harness, saddlery, ammunition boot upper, suit case and upholstery leather, morocco, book binding, shoe-lining leather, etc. Bag tanning process and methods of manufacturing half-tanned leather for export.

*Dyeing of leather.*—Vegetable and coal tar dyes, their properties and uses in leather dyeing. Mordants and strikers. Methods of dyeing leather.

*Stuffing and fat-liquoring of leather.*—Process of currying and fat-liquoring. Fats, waxes and oils used in currying and stuffing. Hand and drum stuffing. Dubbings and stuffing mixtures. Fat-liquors for chrome leather, and different methods of making them. Principles of making commercial fat-liquors.

*Drying of leather.*—Humidity of air and method of its determination and control. Different systems of leather drying.

*Finishing of leather.*—Various finishing materials, their properties and uses, *e.g.*, egg albumin, blood albumin, mucilages, gums, resins, pigment finishes, seasons and nitrocellulose lacquers.

Manufacturing of Enamelled leather for motor car and furniture upholstery.

Manufacture of Patent leather.

Manufacture of gelatine and glue.

### *Practical*

Course:—This course will teach the students practical manufacture, on a semi-commercial scale, of a few typical varieties of leather from Indian hides and skins which are of commercial importance in India. The students will have to manufacture the following varieties of leather: (1) Box and willow sides, (2) glacé kid, (3) chrome sheep, (4) vegetable and chrome sole leather, (5) harness leather, (6) suit case leather, (7) chrome picking band and lace leather, (8) vegetable tanned light leathers such as morocco, book binding and lining leather, (9) chamois leather of combined formaldehyde and oil tannage, (10) white leather by alum tannage, (11) half-tanned E.I. kips and (12) half-tanned goat and sheep skins.

## (ii) ANALYTICAL CHEMISTRY OF LEATHER MANUFACTURE

### *Theoretical*

Course:—This course will explain by lectures the analytical methods in use in modern leather industry for analysing different materials used in tanning and controlling the processes involved in leather manufacture. The lectures will be on the analysis of water, lime, sulphides, lime liquors, chrome salts, chrome liquors, vegetable tanstuffs, tanning extracts, vegetable tan liquors, soap, oils, fats, waxes and leather. pH, its application in tanning and methods of its determination will be explained.

### *Practical*

Course:—Analysis of water, lime, lime liquors, sodium sulphide, red arsenic, chrome liquors, oils, fats and waxes, soap, leather, solid tanning materials, solid and liquid tanning extracts.

pH value determination of lime, bate, vegetable and chrome tan liquors.

## (iii) ELEMENTARY CHEMISTRY

### *Theoretical*

Course:—Introductory, chemical change, chemical nomenclature and symbols; atomic theory, valency, general properties

of gases, electrolysis, dissociation. General properties of liquids, solutions and colloids.

*Typical non-metallic elements.*—Hydrogen, Oxygen, Nitrogen, Carbon, Sulphur and Boron, with their chief compounds.

Metals and such of their oxides and salts as are used in the tanning industry.

Potassium, Sodium, Calcium, Magnesium, Aluminium, Chromium, Iron, Copper, Zinc, Lead and Titanium.

The growth of Organic Chemistry, empirical and molecular formulæ, analysis of organic compounds.

*Aliphatic compounds.*—(a) Paraffins, (b) Halogen derivatives, (c) Alcohols, (d) Ethers, (e) Aldehydes and Ketones, (f) Esters, (g) Amines, (h) Fatty acids, (i) Polyhydric alcohols, (j) Simple Carbohydrates and (k) Elements of the Chemistry of Proteins.

*Aromatic compounds.*—(a) Hydrocarbons, (b) Halogen compounds, (c) Nitro compounds, (d) Amines, (e) Phenols, (f) Acids, (g) Diazotisation, (h) Elementary knowledge of the nature and preparation of synthetic dyes, (i) Tannins, their qualitative tests, classification and elementary notions of the constitution of Gallo-tannic acid.

### *Practical*

Course:—Qualitative analysis of Inorganic mixtures containing two radicals from the five groups, and their oxides, hydroxides, chlorides, sulphides, sulphates and carbonates.

Gravimetric estimation of Calcium, Magnesium, Zinc, Iron, Aluminium and Chromium.

Acidimetry, alkalimetry and iodometry.

### (iv) ELEMENTARY MICROSCOPY AND BACTERIOLOGY OF LEATHER MANUFACTURE

#### *Theoretical*

Course:—A. Microscopy. The Microscope—Description of the optical and mechanical parts.

The technique of microscopy and care of the instrument.

Technique of section cutting.—Preparation and embedding of material. Cutting, staining and mounting of sections.

(a) Examination of hair, wool, collagen fibres, principal barks, leaves, powdered myrobalans and extracts used in tanning in India.

(b) Identification of different kinds of hides and skins from the examination of their grain surface.

(c) Comparative study of the structure of different kinds of hides and skins.

(d) Finished leather, its relation between quality and structure.

(e) Defective leathers. Investigation of defects due to insect, mould and bacterial damage. Exudations on leather.

*Microscopy of manufacturing processes.*—Soaking, liming, bating, pickling, tanning and finishing.

Microphotography.

B. Bacteriology, Micro-organisms—their classification, structure, growth and reproduction. Effect of food, moisture, temperature and light.

*Bacterial metabolism.*—Chemical changes produced by them during parasitic phase, production of acids, ferments, gas, colour, etc. Putrefaction and decay. Bacterial associations.

*Bacteria and disease.*—Parasites and saprophytes, mode of entry, infection and resistance of the animal body.

Cultivation and isolation of micro-organisms.

Method of examination and study of micro-organisms, *e.g.*, Staphylococci, Streptococci, Micrococci, Bacillus Coli, Bacillus Erodians, B. Furfuris, B. Proteus, B. Liquefaciens, Clostridium Putrifans, B. Anthracis, B. Subtilis, B. Mycodes, Acetic, Butyric and Lactic bacteria, Mycoderma, Tannica, Yeasts and Moulds, Protozoa.

Effects of Micro-Organisms in the processes of curing, soaking, depilation, bating, drenching and tanning. Damages due to micro-organisms.

Anthrax in animals and man. Anthrax in the leather trade. Sources of infection. Methods of sterilisation and treatment. Home Office Regulations.

### Practical

Course:—A. Microscopy. Use of microscope, section cutting, staining and mounting; Microscopical studies of hair, wool, collagen fibres, principal Indian vegetable tanning materials, process hides and skins, leather, defects of leather due to insects, moulds and bacteria.

B. Bacteriology. Morphology of bacteria. Preparation of culture media, cultivation and isolation of bacteria.

### (v) LEATHER TRADES ENGINEERING

#### Theoretical

Course:—The object of the course is to acquaint the students, by general descriptive lectures, with various kinds of machinery and power plants they may be brought in contact with in a modern tannery and to make them familiar with the way to construct the usual types of tannery sheds, buildings, pits, etc., as are found in India.

Construction of sheds and buildings of small and medium sized tanneries. Lay-out and construction of pits. Costs of sheds and pits. Rational laying out of machinery.

*Steam boilers.*—Different types of boilers, their various sizes, capacity and suitability for a specific purpose. Their installation and maintenance. Different classes of coal used in Bengal. Burning spent tan in boilers. Boiler compositions. Boiler feed pumps and feed water heaters.

*Steam engines.*—Principal types and sizes of steam engines. General idea of their construction, component parts and working. Their efficiency and steam consumption. Their Horse Power.

*Electric power and lighting.*—Elementary knowledge of the generation and distribution of electrical energy. Electric wiring and different types of wires used. Direct and alternating currents. Transformers. Direct current and alternating current motors. Commercial instruments and methods of measuring current, resistance, pressure, power and energy

#### *Practical*

Course:—Drawing, Dismantling of different machines, Study of different component parts and their assemblage.

#### (vi) ELEMENTARY BOOK-KEEPING

##### *Theoretical*

Course:—Principles of book-keeping.—Single entry and Double entry systems and their comparison.

Theoretical Journal and different practical subsidiary books—Cash book, purchase book, sales book, returns book and journal proper.

Petty cash book, bank transactions, bill transactions and consignments.

Postings into ledger, trial balance, profit and loss account and balance sheet.

Elementary knowledge of Partnership and Joint Stock Company's accounts.

*Costing.*—Different principles—special subjects.

*Process cost.*—Raw hide purchase and stock book. Process stock and output book. Allocation of expenses and its principles. Final cost book. Stores and tanning materials.—Purchase, issue and ledger. Finished leather stock book, leather sales book.

## CHAPTER XXXIX

### LICENTIATE IN TEACHING

1. An Examination for the Licentiate in Teaching shall be held annually in Calcutta\* at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination not less than one year after passing the Intermediate Examination in Arts or Science, provided he has attended a regular course of lectures on the Art and Theory of Teaching in a College or Colleges affiliated in Teaching and in addition, has undergone a course of practical training as indicated in Rule 6 below. The theoretical portion of the course shall consist of the following subjects :—(1) Principles of Education, (2) Methods of Teaching and School Administration, (3) History of Education, (4) English Composition.

3. There shall be a written examination in each of the subjects (1), (2), (3) and (4) and a practical examination for testing skill in teaching. The practical test shall consist of a lesson or lessons to be given by each candidate to a class or classes at some recognised school in Calcutta. Each candidate shall select three of the following subjects and prepare one 'Notes of a Lesson' in connection with each of them. The examiners shall decide which of the lessons prepared by the candidate shall be given by him.

- I. English.
- II. Vernacular.
- III. A Classical or a Modern Language.
- IV. History.
- V. Geography.
- VI. Mathematics.
- VII. Science or Nature Study.
- VIII. Hygiene.
- IX. Art or Manual Work.
- X. The Kindergarten System.
- XI. Methods of Teaching and testing the Primary School subjects. Methods of Inspection.
- XII. Music.

\*The examination may also be held in such places other than Calcutta as the Syndicate may appoint from time to time.

4. There shall be one paper in (1), two papers in (2), one paper in (3) and one paper in (4). Each paper shall be of three hours' duration, and shall carry 100 marks. 300 marks shall be allotted to the practical examination. In order to pass, a candidate must obtain 40 per cent. in each of the subjects (1), (2), (3) and (4), and also in the practical examination; and candidates obtaining at least 60 per cent. of the total marks shall be declared to have obtained a First Class and candidates obtaining between 40 per cent. and 60 per cent. of the total marks shall be declared to have obtained a Second Class. The list of both classes of successful candidates shall be published in order of merit. Letters shall be affixed to the names of candidates who obtain 80 per cent. in any of the special subjects or in practical teaching.

Provided that the candidates who pass the theoretical and practical portions of the examination separately under Section 7 shall be declared to have passed the examination when they have passed in both portions of the examination. Their names shall be published separately, arranged in alphabetical order, and shall not be included in the list of candidates whose names are published in order of merit in Classes I and II.

A fee of Rs. 30 shall be payable by every candidate. If the candidate fails to pass or to present himself at the examination, he shall not be entitled to claim a refund of the fee.

5. The limits of the different subjects shall be as follow:—

### *I. Principles of Education*

The meaning of Education. The aim of Psychology. The relation of Psychology to Education.

Description of the nervous system and its functions. Sensation, perception and conception. Memory and imagination. Interest and attention. Relation of language to thought. The formation of clear and connected ideas. Fatigue and boredom. The mental development of the child and the adolescent.

Instincts and their relation to children's interests. Feeling and its expression; emotions and sentiment; pleasure and pain.

The forms of activity and of expression. The function of play. Suggestion, limitation and habit. Development of will, conduct and character.

The application of Psychology to the teaching of the school subjects.

### *II. Methods of Teaching and School Administration*

The general principles and methods of teaching and their application to the subjects included in the curriculum of secondary schools.

Functions and characteristics of a good school, order and discipline. Free discipline, authority and influence of the teacher. Punishments and rewards. Relation of guardians and teachers. Qualifications and duties of the staff. The specialist and the class master. The problem of individual differences.

Classes and classification of pupils. The curriculum and the time-table. Practice exercise. Tests, Marks, School and public examinations. Promotions. The school library. Homework and private tuition. The school furniture and apparatus. The museum, school gardens. The school office and records.

The hostel and its management.

### III. *History of Education*

- (i) Modern developments in education in Great Britain.
- (ii) Education in Modern India with special reference to Bengal.

### IV. *English Composition including Translation, Essay-writing, etc.*

6. Practical skill in teaching.—Systematic provision shall be made for enabling students to see lessons being given by teachers of special competence and experience. Criticism lessons shall be conducted with small groups of students.

Each student shall give a number of lessons in approved schools under supervision. The number of lessons may be decided by the Principal of the College but may in no case be less than 40. The greater part of this practice should be of a continuous nature. 40 per cent. of the marks for the practical examination shall be allotted by the Principal of the College for these practice lessons given during the course. All lesson note-books shall be available for the examiners.

7. A candidate may present himself for the theoretical and practical portions of the examination separately, provided that the interval between the two does not exceed two years. If the interval exceeds two years, both the theoretical and practical portions of the examination shall be taken together.

8. Books shall be prescribed from time to time by the Syndicate on the recommendation of the Board of Studies in Teaching.

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## CHAPTER XL

### BACHELOR OF TEACHING

1. An examination for the Degree of Bachelor of Teaching shall be held annually in Calcutta and at such other places as shall from time to time be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination provided that, after passing the B.A. or B.Sc. Examination, he has prosecuted for not less than one academical year a regular course of study in the subjects offered by him, in one or more colleges affiliated to the University for this purpose, and has, in addition, undergone a course of practical training as indicated in Section 10 below.

3. Candidates satisfying the requirements of any of the following sub-sections may be admitted to the examination without compliance with the conditions laid down in Section 2 ; such candidates shall be treated as non-collegiate students:—

(a) Any candidate who has passed the examination for the Licentiate in Teaching and has either graduated in Arts or in Science or served as a teacher in a recognised school for at least seven years.

(b) Any graduate teacher in a recognised school, who after passing the University Teachers' Training Certificate Examination has served as a teacher for at least two years, provided that (i) he has graduated with Honours, or (ii) he has obtained the degree of M.A. or M.Sc. in the First or in the Second Class, or (iii) he has passed the University Teachers' Training Certificate Examination with Distinction, or (iv) the school in which he serves is specially approved under Chapter XL-D.

Notwithstanding anything contained above special permission may be granted to graduate teachers in recognised schools, who have passed the University Teachers' Training Certificate Examination previous to June, 1939, to appear at the examination for the Degree of Bachelor of Teaching as non-collegiate students provided that such special permission shall not extend beyond the B.T. Examination in 1942.

4. Every candidate for the B.T. Examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate, at least six weeks before the date fixed for the commencement of the examination.

Every candidate sent up for the examination by an affiliated college shall in addition produce a certificate (a) of good conduct, (b) of diligent study, (c) of having satisfactorily passed the College periodical examinations and other tests and (d) of probability of passing the examination.

5. A fee of Rs. 40 shall be forwarded by each candidate with his application.

A candidate who fails to pass or to present himself for examination shall not be entitled to claim a refund of the fee; but such a candidate may be admitted to one or more subsequent examinations for the degree of Bachelor of Teaching on payment of a like fee of Rs. 40.

6. The written examination for the degree of Bachelor of Teaching shall be conducted by means of printed papers, the same papers being used at every place at which the examination is held.

7. Every candidate shall be examined in the following subjects:—

- (1) Principles of Education including Educational Psychology ... *Two Papers.*
- (2) History of Education: ... *One Paper.*
- (3) General Methods, School Organisation and School Hygiene ... *One Paper.*
- (4) Contents and Methods of teaching any three school subjects from the following list, Geography being considered as equivalent to two subjects:— ... *Three Half Papers.*
  - (i) English.
  - (ii) A Classical Language.
  - (iii) A Modern Indian Language: Bengali or Hindi or Urdu or Assamese.
  - (iv) A Modern European Language: French or German.
  - (v) History.
  - (vi) Mathematics.
  - (vii) Geography.
  - (viii) Hygiene.
  - (ix) Music.
  - (x) Arts and Crafts.
  - (xi) Physical Sciences (Physics, Chemistry and Astronomy).
  - (xii) Biological Sciences (Botany, Zoology, Physiology) and Geology.
  - (xiii) Primary and Infant School Subjects.

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

- (5) Essay and Composition in one of the Modern Indian Languages (Bengali or Hindi or Urdu or Assamese), or in English in the case of those whose mother tongue is not one of the above four languages ... *One Paper.*
- (6) A candidate may, if he so desires, be also examined in one of the following additional subjects:— ... *One Paper.*
- (i) Mental and Educational Measurements
  - (ii) Social and Abnormal Psychology applied to Education.
  - (iii) Mental Hygiene and Child Guidance.
  - (iv) Methods and Organisation in Nursery Schools, Kindergartens and Montessori Schools.
  - (v) Comparative Education with reference to selected countries in Europe and America.
  - (vi) Education of Handicapped Children with reference to some Selected Types.

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

8. There shall be a written examination in each of the subjects (1) to (5) and in the additional subject, if any. There shall also be a practical examination for testing the candidate's skill in teaching, and also his skill in Laboratory work in the case of a candidate who offers Geography or Science.

9. Each theoretical paper shall be of three hours and shall carry 100 marks. Each half paper shall be of two hours and shall carry 50 marks.

250 marks shall be allotted for the practical examination as follows:—

- (a) For candidates taking up Science or Geography—
- (i) One lesson to be given to a class (on any one of the subjects taken up by the candidate) ... *100 marks.*
  - (ii) Practical Examination in Laboratory *100 marks.*

* (iii) Lesson Notes, Laboratory Books, etc.	Note- ... 50 marks.
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Total ... 250 marks.

(b) *For candidates not taking up Science or Geography—*

(i) Two lessons to be given to a class or classes (on any two of the subjects taken up by the candidate).	... 200 marks.
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— \* (ii) Lesson Notes, Tutorial work, etc ... 50 marks.

Total ... 250 marks.

10. Colleges affiliated to the B. T. standard shall make systematic provision for enabling the students to see lessons being given by teachers of special competence and experience. Criticism lessons shall be conducted with small groups of students.

Each student shall give a number of lessons in the subjects taken by him under Section 7(4) in selected schools under supervision. The number of lessons may be decided by the Principals of the colleges but shall in no case be less than 30.

All lesson-notes shall be available to the examiners at the time of the practical examination.

11. Candidates intending to appear at the B.T. Examination under Section 3(a) shall be required to prepare notes for 40 lessons on subjects taken by him under Section 7 (4). Such lesson-notes shall be available to the examiners at the time of the practical examination.

Candidates intending to appear at the examination under Section 3(b) shall also be required to keep a record of at least 40 lessons delivered in their schools after they have passed the University Teachers' Training Certificate Examination. This record shall be inspected and taken into consideration at the time of the practical examination.

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\* On the recommendation of the Board of Studies in Teaching the following distribution of marks in (iii) Lesson Notes, Laboratory Note-Books, etc. in (a) and in (ii) Lesson Notes, Tutorial work etc. in (b) was adopted by the Syndicate :—

*For candidates taking up Science or Geography—*

Laboratory Notes	...	20 marks.
Lesson Notes	...	10 marks.
Tutorial work	...	10 marks.
Practice Teaching	...	10 marks.

*For candidates not taking up Science or Geography—*

Lesson Notes	...	10 marks.
Tutorial work	...	20 marks.
Practice Teaching	...	20 marks.

12. The practical test in teaching shall consist of a lesson or lessons to be given by each candidate to a class or classes at some recognised school.

Candidates will be required to prepare, for presentation to the examiners at least a week before the examination, full teaching notes of three lessons, *i.e.*, one lesson for each of the subjects taken up under Section 7(4). The notes should indicate (a) the age of the pupils for whom the lesson is intended, (b) the previous knowledge which they are assumed to possess, and (c) the diagrams, maps, apparatus and other illustrations which it is proposed to use. The examiners shall decide which of the lessons prepared by the candidate shall be given.

The examiners may require a candidate to give an extra lesson if, in their judgment, such a lesson is necessary.

13. A candidate may present himself for the theoretical and the practical portions of the examination separately, provided that the interval between the two does not exceed two years. If the interval exceeds two years, both the theoretical and the practical portions of the examination shall be taken together.

14. In order to pass, a candidate must obtain 40 per cent. of the marks in each of the compulsory subjects and 40 per cent. of the marks in the practical examination.

If a candidate has passed in the compulsory subjects and in the practical examination, the marks in excess of 40 obtained by him in the additional subject, if any, shall be added to his aggregate and the aggregate so obtained shall determine his class and his place in the list.

Candidates obtaining at least 540 marks shall be declared to have obtained a First Class and those obtaining 360 marks shall be declared to have obtained a Second Class.

Letters shall be affixed to the names of candidates who obtain 80 per cent. of the marks in any subject or in the practical examination.

The candidate who is placed first in the First Class shall be entitled to a prize of books of the value of Rs. 100.

15. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in two classes, both in order of merit.

Provided that candidates who pass the theoretical and the practical portions of the examination separately under Section 14, shall be declared to have passed the examination when they have passed in both portions of the examination. Their names shall be published separately, arranged in alphabetical order, and shall not be included in the class lists arranged in order of merit.

16. The limits of the different subjects shall be as indicated below. Books shall be prescribed from time to time

by the Syndicate on the recommendation of the Board of Studies in Teaching to indicate the standard and extent of knowledge required in the different subjects.

## PRINCIPLES OF EDUCATION INCLUDING EDUCATIONAL PSYCHOLOGY

### *Paper I*

Concept of education. Educational aims from the point of view of the individual and of society.

Influences of heredity and environment on the mental development of children.

Development of the school idea. Main types of schools and their distinctive functions.

The teacher and his functions.

The curriculum and the principles of curriculum construction.

Mental characteristics of human beings and their development. Chief stages in general development.

A brief review of modern trends in educational theory and practice.

### *Paper II*

Physical basis of mental life.

The general bearing of Psychology upon the theoretical and practical problems of education.

The psychology of individual differences. Intelligence, its nature, measurement and distribution. Instinct. Emotion. Temperament and Character. Preception. Memory. Imagination.

The psychology of the learning process. Acquisition of skill, knowledge and taste. Formation of habits.

Nature and growth of mental functions involved in the learning process. Interest and Attention. Laws of learning. Measurement of learning. Examination. Scholastic tests.

Development of emotions and sentiments; basis of character training.

Psychology of the adolescent.

Educational bearing of the psychology of the unconscious.

Discipline.

Psychology of teaching methods and school subjects.

## HISTORY OF EDUCATION

A brief review of the Hindu, Buddhistic and Islamic systems of education in India.

Contributions of Rousseau, Pestalozzi, Froebel, Herbart, Montessori and Dewey to modern educational thought.

A general survey of the development of elementary, secondary and higher education in Great Britain from 1830 to the present day.

Early beginnings of Western education in India. Macaulay's Minute.

Development of Western education in India. Important educational despatches.

Promotion of education through local self-governing bodies. Primary Education Acts in India. An outline survey of the development of elementary education in India.

Present position of secondary education (with special reference to Bengal and Assam).

Indian Universities' Act and the growth of Indian Universities. Calcutta University Commission. Later development of the Universities with special reference to Calcutta University; its organisation, administration and problems.

Development of women's education in India.

A brief review of the national education movement and educational experiments in India.

#### GENERAL METHODS, SCHOOL ORGANISATION AND SCHOOL HYGIENE

School building and equipment. The laboratory and the library.

The teacher; his academic and professional preparation. Selection of teachers.

General organisation. The curriculum and the time-table. Class room administration. Supervision.

Methods of individualised instruction. Project method.

The technique of instruction; Planning a lesson.

Exposition and illustrations in teaching. Teaching aids and appliances. Visual instruction. Correlation of studies.

Self-government in schools. Training in citizenship.

Extra-curricular activities. Games and Recreation.

Examinations and Tests. Pupil progress and promotion. Measurement of teaching efficiency.

Health of school children. Personal and school hygiene. Medical Inspection.

School sanitation.

Conditions of healthy physical life and development of children at home and at school. Tiffin in schools.

Functions and responsibilities of teachers with reference to health and disease.

## CONTENTS AND METHODS OF TEACHING SCHOOL SUBJECTS

*(Three subjects are to be selected, Geography being considered as equivalent to two subjects)*

Detailed study of the contents and methods of teaching three of the following subjects with special reference to High Schools:—

(i) English, (ii) a Classical Language, (iii) a Major Modern Indian Language (Bengali or Hindi or Urdu or Assamese), (iv) a Modern European Language (French or German), (v) History, (vi) Mathematics, (vii) Geography, (viii) Hygiene, (ix) Music, (x) Arts and Crafts, (xi) Physical Sciences (Physics, Chemistry and Astronomy), (xii) Biological Sciences (Botany, Zoology, Physiology and Geology), and (xiii) Primary and Infant School Subjects.

The Syndicate shall, on the recommendation of the Board of Studies in Teaching, indicate from time to time the scope\* of the different subjects enumerated above.

## ESSAY AND COMPOSITION

Essay and Composition in one of the Modern Indian Languages (Bengali or Hindi or Urdu or Assamese), or in English in the case of those whose mother-tongue is not one of the above four languages.

This paper will mainly be a test of the candidate's capacity for dealing with general topics and with the various school subjects through the medium of the language chosen by him.

## ADDITIONAL PAPER

*(Optional)*

Any one of the following subjects:—

**(A) Mental and Educational Measurements—**

Nature of intelligence and other mental characteristics.  
Principles of Testing.

Different types of tests; Intelligence tests, Temperament test and Scholastic tests. Individual and group tests.

Vocational tests and problems of vocational guidance.

Technique of constructing and standardising tests.

\* For Syllabuses in the subjects, as adopted by the Syndicate, *vide* Appendix D.



Statistical methods applied to education; collection and tabulation of educational facts.

Principles of Frequency Distribution.

Measures of Variability.

Frequency curves and Normal Probability curves. Comparison of groups.

Principles of correlation.

Application of statistical method and technique to tests and test results.

*(Students will be expected to do some amount of practical work in connection with this paper.)*

### **(B) Social and Abnormal Psychology applied to Education—**

Distinction between individual and social behaviour. Basic factors in social behaviour. Suggestion, sympathy and imitation.

Groups of different types; unorganised and organised groups. Special characteristics of children's gangs and groups. Group leaders. Training in leadership.

Organised institutions. Social manners and customs. Traditions. School tradition; its effect on the student.

Conflict between the individual and society. Complexes; their origin and development; their influence on mental development. Normal and abnormal minds. Criteria of normality; different conceptions. The psychoanalytic standpoint.

Mental deficiency. Types of maladjusted children. Backward children. Problem children. Delinquent children. Social and criminal tendencies in behaviour.

Treatment and education of maladjusted children; special responsibilities of the school.

### **(C) Mental Hygiene and Child Guidance—**

The problems of Mental Hygiene. Bodily Hygiene and Mental Hygiene. Factors influencing the mental development of the child; Heredity and environment.

The School. Influence of Teachers. Class-mates. Friendship.

Adolescence. Development of sex-consciousness; its influence on mental growth.

Ways of mental development. Retardation of development. Factors leading to retardation. Their working; how to overcome them.

General problems of child guidance.

Responsibilities of parents and guardians, of society, and of educational institutions.

*(D) Methods and Organisation in Nursery Schools, Kindergartens and Montessori Schools—*

Principles of child study with special reference to infant years.

Psychology of the pre-school child.

Curriculum for infant schools.

Organisation and equipment.

Short history of the Infant School Movement from Pestalozzi to Montessori. The Nursery School movement.

Selected writings of Pestalozzi, Froebel and Montessori.

*(E) Comparative Education—*

A general survey of the organisation of national systems of education and of *one* of the following topics, *viz.*, (i) Elementary education, (ii) Secondary education (iii) Technical education in Secondary schools, (iv) Adult education—with special reference to Great Britain, France, Germany, Russia, U.S.A. and Japan.

*(F) Education of Handicapped Children with reference to any ONE of the following Types—*

(i) Deaf and mute.

(ii) Visually handicapped.

(iii) Otherwise physically handicapped, and

(iv) Mentally retarded.

The list may be modified from time to time by the Syndicate on the recommendation of the Board of Studies in Teaching.

## CHAPTER XL-A

### DIPLOMA IN SPOKEN ENGLISH

1. An examination for a Diploma in Spoken English shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Every candidate for the Diploma must have passed the Examination for the Licentiate in Teaching or for a Bachelor's Degree in any Faculty of this University.

3. Every candidate for the Diploma shall produce a certificate to show that he has received training in Elocution for a period of not less than one year under a teacher recognised for this purpose by the Board of Higher Studies in English.

4. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Board of Higher Studies in English, and a fee of Rs. 50, not less than three months before the date fixed for the commencement of the examination.

5. A candidate who fails to pass or present himself for the examination, shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 50 on each occasion.

6. The examination shall be written and oral, and shall be conducted on the lines of a syllabus to be drawn up from time to time by the Board of Higher Studies in English and Board of Studies in English jointly. The examiners shall be appointed by the Syndicate on the joint recommendation of the Boards.

7. The written examination will consist of one paper and will be held with a view to test a candidate's knowledge of the elements of Phonetics with special reference to the pronunciation of English words.

8. The oral examination will be held mainly with a view to test a candidate's power of elocution and his ability to carry on an ordinary conversation in English.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates, arranged in order of merit, in two classes. Candidates shall be barkedted

together unless the examiners are of opinion that there is clearly a difference in their merits. The candidate who is placed first in the First Class shall receive a gold medal and a prize of books to the value of Rs. 200, the candidate who is placed second in the First Class shall receive a silver medal and a prize of books to the value of Rs. 100.

### SYLLABUS

#### *Written Examination (Sec. 7)*

Simple questions will be set on—

- (a) The organs of speech.
- (b) The use of the voice (articulation, phrasing,
- (c) The classification and production of sounds.

#### *(Oral Examination (Sec. 8)*

- (a) Reading—(i) Prose; (ii) Poetry.
- (b) Recitation.
- (c) Conversation.
- (d) A short speech.

The courses of study shall be prescribed and books shall be recommended from time to time, by the Syndicate on the joint recommendation of the Board of Higher Studies in English and the Board of Studies in English.

100 marks shall be assigned to the written examination; the minimum required for a pass shall be 30 marks.

400 marks shall be assigned to the oral examination; the minimum required for a pass shall be 200 marks.

No candidate shall be declared to have passed, unless he shall have obtained the prescribed minimum in the written as also in the oral examination.

Candidates who pass and obtain 300 marks in the aggregate shall be placed in the First Class.

## CHAPTER XL-B

### ENGLISH TEACHERSHIP EXAMINATION

1. The Examination for English Teachership Certificate shall be held twice in each year, ordinarily in January and July, in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the date to be duly notified.

2. Unless otherwise provided a candidate for the examination must have passed the Intermediate Examination and have served in a recognised school as a teacher for at least one year prior to the examination. Provided, however, that if the candidate has already graduated in any Faculty, he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least eight weeks (which need not be consecutive) a special short course of training organised or recognised by the University for the purpose.

Provided that all persons who have been teachers in English in recognised schools on 31st March, 1935, will be entitled to appear at the examination after having undergone training as above.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of Rs. 10 on each occasion but he will not be required to attend any further course of training.

5. The examination shall be written, oral and practical and shall be conducted on the lines of syllabus\* to be drawn

\*The following syllabus has been approved by the Syndicate on the joint recommendation of the Board of Studies in English and the Board of Studies in Teaching :—

(a) Written Examination                      ...                      ...                      ... 150 marks.

There shall be one paper with two halves each of two hours and each carrying 75 marks.

up from time to time by the Syndicate on the joint recommendation of the Board of Studies in English and the Board of Studies in Teaching. The Paper-setters and Examiners shall be appointed by the Syndicate on the joint recommendation of the Boards. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. The written examination shall consist of one paper. The oral examination will be held mainly with a view to testing the candidate's ability to read English prose and poetry and his ability to carry on an ordinary conversation in English. The practical examination will be held with a view to testing the candidate's ability to teach English in any of the classes of a recognised High School.

7. The examination shall be conducted as follows :—

(a) *Written*—

A small number of books will be recommended for study from which questions of a general character will be set and the candidates will be expected to answer them in the form of short essays. A choice of questions will be given.

The subjects for the written examination shall consist of—

- (i) Method of teaching English in India.
- (ii) Elementary Phonetics of English.
- (iii) Detailed Knowledge of English Grammar.
- (iv) English Composition in the form of short essays on subjects occurring in a number of selected texts and Translation.

The marks for the written paper shall be distributed as follows:—

First half	...	{	Method of Teaching English	...	50 marks.
			Phonetics	...	25 marks.
Second half	...	{	Grammar	..	25 marks.
			Composition	...	30 marks.
			Translation	...	20 marks.
Total				...	150 marks.

(b) Oral Examination ... 150 marks.

The oral examination will be held mainly with a view to testing the candidate's ability to read English prose and poetry and his ability to carry on an ordinary conversation in English.

(c) Practical Examination ... 200 marks.

The Practical examination will be held with a view to testing the candidate's ability to teach English in any of the classes of a recognised High School.

(b) *Oral*—

Each candidate shall be examined by a Board of at least two examiners in—

- (i) Reading aloud Prose and Poetry;
- (ii) Conversation.

(c) *Practical*—

The candidate's ability to teach English shall be tested by a lesson on a subject selected by a candidate beforehand in such a manner as may be prescribed by the Syndicate.

8. 150 marks shall be assigned to the Written Examination. The minimum required for a pass shall be 60 marks.

150 marks shall be assigned to the Oral Examination, of which 100 marks shall be allotted to the reading of English prose and poetry and 50 marks to conversation. The minimum required for a pass shall be 60 marks.

200 marks shall be assigned to the Practical Examination. The minimum required for a pass shall be 100 marks.

No candidate shall be declared to have passed, unless he shall have obtained the prescribed minimum in each of the written, oral and practical portions of the examination. Under certain circumstances enumerated in paragraph 9 of this chapter, exemptions from appearing at the written examination may, however, be obtained.

9. The following teachers who have been in service in recognised schools on the 31st March, 1935, but who do not possess the qualifications mentioned in Section 9 (B) of Chapter XXI of the Regulations shall be exempted from appearing at the written portion of the examination :—

- (i) Head Masters of recognised schools.
- (ii) All Assistant Head Masters and Assistant Teachers who have served as teachers of English in recognised schools.

10. Graduates who obtained not less than 50 per cent. marks in the aggregate in English in their B.A. Examination may be exempted from appearing at the written portion of the examination, even if they have not served as teachers.

11. Candidates must appear at the Written, Oral and Practical Examinations together, unless otherwise exempted. If any candidate passes in the written portion, but fails in the Oral and/or Practical, he will be entitled to appear at the Oral and/or Practical portion of the examination, as the case may

be, in the next three examinations. In case a candidate fails to pass during this period or fails in the written portion of the examination, he will have to sit at all the portions of the examination (Written, Oral and Practical) again.

12. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in alphabetical order of the surnames of the candidates in one class.



## CHAPTER XL-C

### TEACHERS' TRAINING CERTIFICATE EXAMINATIONS

- A—Examination for the Teachers' Training Certificate  
(*General*).
- B—Examination for the Teachers' Training Certificate  
(*Science*).
- C—Examination for the Teachers' Training Certificate  
(*Geography*).
- D—Examination for the Teachers' Training Certificate  
(*Art Appreciation*).

#### *A. Examination for the Teachers' Training Certificate (General)*

1. The examination for the Teachers' Training Certificate (*General*) shall be held twice in each year, ordinarily in April and September, in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the Intermediate Examination and have served in a recognised school as a teacher for at least two years prior to the examination or have passed the Degree Examination and have served in a recognised school for at least one year prior to the examination. Provided, however, that if the candidate has already graduated in any Faculty with Honours or Distinction, or has obtained the Master's Degree, he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least three months a short course of training organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any

further course of training, provided that a candidate who fails in the Practical and Oral examinations will be required to produce a certificate of practice-teaching in a recognised High School from the head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be Written, Oral and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (a) Every candidate shall be examined in the following subjects:—

- |   |                   |
|---|-------------------|
| (i) General Principles of Education   | ... One Paper.    |
| (ii) Educational Psychology   | ... One Paper.    |
| (iii) Education in Bengal and Assam   | ... One Paper.    |
| (iv) and (v) Methods of Teaching School Subjects,—Any two of the following School Subjects, to be selected by the candidate, <i>viz.</i> , English, Bengali, Assamese, Mathematics, History and Hygiene | } One Paper each. |

The Syndicate shall have power to modify or add to this list.

Each paper shall be of three hours and shall carry 100 marks.

(b) There shall also be a Practical and Oral Examination, to which 100 marks shall be assigned. 50 marks shall be assigned to practice-teaching, lesson notes and tutorial work.

7. The limits of the different subjects shall be as follows:—

*(Only a general treatment of the subjects will be given)*

#### (I) GENERAL PRINCIPLES OF EDUCATION

The meaning of Philosophy of education.

The function of education in the biological record.

The meaning and aim of education. Comparative study of different aims of education.

Factors of education: pupil, teacher, curriculum and educational environment.

Child-centric education: its brief history and significance.

Material for education: the child; his nature and nurture.

General laws of learning and habit formation.  
 Educational agencies. School, its position and function.  
 Need for co-operation of different educational agencies.  
 Curriculum; principles of curriculum construction.  
 Subjects in the curriculum. Extra-curricular activities.  
 Methods of education.  
 Individual work. Kindergarten. Montessori Method. Dalton  
 Plan. Playway in education.  
 Project Method and correlation of studies.  
 Discipline and punishment.  
 School community.  
 Teaching and lesson notes.  
 Tests and examinations.

## (II) EDUCATIONAL PSYCHOLOGY

### A

#### *Introduction*

Psychological aspect of education.  
 Scope and methods of Educational Psychology (including  
 statistical methods).  
 Physiological basis of mind: Sense organs, muscles and the  
 nervous system.  
 Nature of mind.  
 Different mental functions and their inter-relations.  
 General mental development: Conditions—Heredity and  
 Environment

### B

#### *Original Nature*

Reflexes, Instincts and Emotions  
 Educational bearings of Instincts.  
 Psychology of the Adolescent  
 Basis of character training.  
 Intelligence: Theories and Methods of Measurement  
 Mental Tests.

### C

#### *Modification of Original Nature*

Learning: Animal and human learning.  
 Laws of conditions.  
 Learning Curve: Acquisition of skill and memorisation.  
 Fatigue in learning; Transfer of training.  
 Measurement of Learning; Examination; Scholastic Tests.

## D

*Guidance of Learning*

Discipline.

Exceptional and 'problem' children.

Psychological foundations of some prevalent systems of education.

Psychology of the class room methods.

*Practical Work*

Students are expected to be familiar with the following:—

1. Simple Sensory and Motor Tests.
2. Intelligence Tests.
3. Learning curve.
4. Tests for determination of Memory Span
5. Word association test.

## (III) EDUCATION IN BENGAL AND ASSAM

*(Its History, Organisation and Administration)*

Education as prevailing prior to 19th century.

Early beginnings of Western education.

Anglicist-Orientalist controversy.

Macaulay's Minute: Bentinck's Resolution.

Adam's education survey and report.

Primary Education: Hardinge schools

Educational Despatches of 1854 and 1859.

Attempts at imposition of educational cess.

Education Commission of 1882.

Promotion of education through local self-governing bodies.

Curzon's educational policy: the Indian Universities Act of 1904.

Attempts at introduction of compulsory primary education.

Indian Educational Policy of 1913.

Calcutta University Commission.

Higher Teaching and Research in Calcutta.

Dacca University and Board of Intermediate Studies.

Bengal Primary Education Acts of 1919 and 1930 and Assam Primary Education Act of 1926.

Education of women and girls.

Present position of secondary education in Bengal and Assam, its organisation, administration and problems.

## (IV) AND (V)

Detailed Study of the Methods of Teaching *two* of the following school subjects:—(a) English, (b) Bengali, (c) Assamese, (d) Mathematics, (e) History and (f) Hygiene.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the marks in the practical examination and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

*B. Examination for the Teachers' Training Certificate  
(Science)*

1. The examination for the Teachers' Training Certificate (*Science*) shall be held twice in each year, ordinarily in June and December, in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the B.Sc. Examination or must possess qualifications considered equivalent thereto for this purpose at least one year prior to the examination and he must produce a certificate to show that he has undergone for at least three months a special course of training in Science organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any further course of training, provided that a candidate who fails in any of the practical examinations will be required to produce a certificate of practice-teaching in a recognised High School from the head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be Written, Oral and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on

the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (1) Every candidate shall be examined in the following subjects:—

- (i) Principles of Education and Methods of Teaching Science ... *One Paper.*
- (ii) Astronomy, Geology, Physics and Chemistry ... *One Paper.*
- (iii) Botany, Zoology and Physiology ... *One Paper.*

(2) (a) The first paper shall be of three hours and shall carry 100 marks.

Lesson notes and tutorial work shall carry 50 marks.

(b) Each of the second and third papers shall be of three hours and shall carry 100 marks.

(c) There shall also be Practical examinations in each of the following subjects:—

Physics, Chemistry, Geology, Botany, Zoology and Physiology, carrying total marks of 150.

7. The limits of the different subjects shall be as follows:—

#### PRINCIPLES OF EDUCATION AND METHODS OF TEACHING SCIENCE

##### *Principles of Education—*

Aim of education. Psychology and Education. Growth of self. General laws of learning and habit formation. Correlation of studies. Project and other methods of teaching. Lesson Notes. Tests and Examinations.

##### *Methods of Teaching Science—*

(a) Aims of Science Teaching.

(b) Claims of Elementary Science to a place in the curriculum of secondary schools—purpose and construction of the syllabus—interpretation of the syllabus and the teaching of individual subjects—general nature of the teaching of science.

(c) Detailed study of the various methods—practical and theoretical—method of investigation—heuristic method; history of discovery—Herbartian method applied to science teaching—deductive and inductive methods—the 'sequence' and 'forms' of instruction—the logical and psychological sequences—analysis and synthesis generalisation—preparation of notes of lessons.

(d) Habit and skill in science teaching—instruction aiming at skill—intellectual control of data—note books—diagrams and lesson notes—text-books—reference for further reading.

The Syndicate will, from time to time, indicate the scope of the different science subjects to be taught.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the aggregate marks in the Practical examinations and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed, from time to time, by the Syndicate.

*C. Examination for the Teachers' Training Certificate  
(Geography)*

1. The examination for the Teachers' Training Certificate (*Geography*) shall ordinarily be held twice in each year in Calcutta and in such other places as shall, from time to time, be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have ordinarily passed the degree examination and have served in a recognised school as a teacher for at least one year prior to the examination. Graduates who have passed the Intermediate Examination with Geography as one of their subjects and Under-Graduates with special qualifications may be allowed to appear at the examination in special circumstances by the Syndicate.

He shall also produce a certificate to show that he has undergone a special course of training in Geography organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10, not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term, may be admitted to two subsequent examinations on payment of the prescribed fee on each occasion without undergoing any further course of training, provided that he will be required to produce a certificate of satisfactory practice-teaching in a recognised High School from the Head of the institution.

If such a candidate desires to appear at any subsequent examination other than the two mentioned above, he shall be

required to undergo a fresh course of training for the full period in accordance with these regulations.

5. The examination shall be Written, Oral and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination Board to consider the results and report the same to the Syndicate for confirmation.

6. (1) Every candidate shall be examined in the following subjects :—

- |   |                |
|---|----------------|
| (i) Principles of Education and Methods of Teaching Geography | ... One Paper. |
| (ii) (a) Mathematical Geography and Climatology.              | } One Paper.   |
| (b) Physiography and Geomorphology and Biogeography.          |                |
| (iii) (a) Human Geography and Commercial Geography            | } One Paper.   |
| (b) Regional Geography and Map-Making                         |                |

Each paper shall be of three hours and shall carry 100 marks.

(2) (a) There shall also be a Practical and Oral Examination to which 100 marks shall be assigned.

(b) 50 marks shall be assigned to practice-teaching, lesson notes and tutorial work and 50 marks to practical work in Surveying and Map-Making done during the three months' term.

7. The limits of the different subjects shall be as follows :—

*Principles of Education—*

Aim of Education. Psychology and Education. Growth of self. General laws of learning and habit formation. Correlation of studies. Project and other methods of teaching. Lesson notes. Tests and examinations.

*Methods of Teaching Geography—*

Geographical appliances ; maps, models, diagrams, sketches. Value of excursions and different types of practical work. Different methods of teaching according to different stages.

The Syndicate will, from time to time, indicate the scope of the different subjects enumerated in items (ii) and (iii) of Section 6.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the theoretical papers, and 40 per cent. of the marks in the Practical and Oral examination, and 40 per



cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate, he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

*D. Examination for the Teachers' Training Certificate  
(Art Appreciation)*

1. The examination for the Teachers' Training Certificate (*Art Appreciation*) shall be held annually in Calcutta and in such other places as shall from time to time be appointed by the Syndicate, the dates to be duly notified.

2. A candidate for the examination must have passed the Matriculation Examination and have served as a teacher of Drawing in a recognised school for at least *one* year prior to the examination : Provided, however, that, if the candidate has passed the Final Examination of any recognised school of Art he will be allowed to appear at the examination without being required to serve as a teacher.

He shall also produce a certificate to show that he has undergone for at least three months a short course of training organised or recognised by the University for the purpose.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 10 not less than one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or appear at the examination immediately following the completion of his term shall not be entitled to claim a refund of the fee, but such a candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion and on his undergoing a fresh course of training as required under Section 2 above during the year immediately preceding the examination at which he presents himself.

5. The examination shall be Written and Practical, and in accordance with the prescribed syllabus. The Paper-setters and Examiners shall be appointed by the Syndicate on the recommendation of a Committee to be annually constituted by the Syndicate. The Syndicate shall also appoint an Examination

Board to consider the results and report the same to the Syndicate for confirmation.

6. (a) Every candidate shall be examined in the following subjects :—

- |                                   |   |                |
|-----------------------------------|---|----------------|
| (i) (a) General Principles of Art | } | ... One Paper. |
| (b) Principles of Indian Art      |   |                |
| (ii) (a) Indian Sculpture         | } | ... One Paper. |
| (b) Indian Painting               |   |                |
| (iii) (a) Architecture            | } | ... One Paper. |
| (b) European Art                  |   |                |

The Syndicate shall have power to modify or to add to this list.

Each paper shall be of three hours and shall carry 100 marks.

(b) There shall also be a Practical Examination to which 100 marks shall be assigned. 50 marks shall be assigned to practice teaching and class work.

7. The limits of the different subjects shall be as follows :—

*I. General Principles of Art—*

- (a) What is Art ?
- (b) Evolution of Art.
- (c) Different sections of Art.
- (d) Analysis of Art.

*II. Principles of Indian Art—*

- (a) Six Limbs of Indian Painting.
- (b) Indian Artistic Anatomy.

*III. Indian Sculpture—*

Characteristics of Indus Valley, Maurya, Post-Maurya, Gupta, Post-Gupta and Mediaeval Schools.

*IV. Indian Painting—*

Characteristics of Ajanta, Mughal and Rajput Schools and Manuscript Paintings. Also modern trends.

*V. Architecture—*

- (a) Western Architecture—Characteristics of some ancient and modern styles.
- (b) Indian Architecture—Characteristics of ancient and mediaeval styles.

*VI. European Art—*

- (a) Characteristics of Principal Schools of Sculpture.
- (b) Characteristics of Principal Schools of Painting.

*VII. Minor Arts and Crafts of the East and the West (Principal types).**VIII. Practical and Demonstration Work—*

On selected subjects from the following:—

- (1) Paper-folding.
- (2) Lino-cut.
- (3) Cut-paper designing.
- (4) Embroidery.
- (5) Stencil work.
- (6) Clay modelling.
- (7) Toy making.
- (8) Leather work.
- (9) Fresco.
- (10) Pottery.
- (11) Wood-cut.
- (12) Wood-engraving.

The course shall include special lectures on Comparative Art including a course on General Principles of Education and Theory of Art Teaching.

8. In order to pass, a candidate must secure 36 per cent. of the marks in each of the Theoretical papers and 40 per cent. of the marks in the Practical Examination and 40 per cent. of the aggregate. If he passes, and obtains 60 per cent. of the aggregate he shall be declared to have passed with Distinction.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

10. Books shall be prescribed from time to time by the Syndicate.

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## CHAPTER XL-D

### APPROVAL OF RECOGNISED SCHOOLS FOR B.T. TRAINING

1. Any recognised school may apply to the Registrar for approval by the Syndicate as an institution competent to train candidates for the examination for the degree of Bachelor of Teaching for purposes of Sec. 3 (b) of Chapter XL of the Regulations.

Such school must satisfy the Syndicate that—

(i) It has a Head Master who will be able to assist the intending candidates for the B.T. Degree.

(ii) It has at least two teachers on its staff who have previously obtained a recognised diploma or degree in teaching.

(iii) It has adequate funds for the purchase of books and periodicals in accordance with such list as may be prescribed by the University. The library containing such books and periodicals should be in existence before approval takes effect.

(iv) Sufficient facilities are given to each intending candidate for study and practical work under the supervision of the Head Master and the trained teachers.

2. The University shall arrange for inspection of each school before placing it on the approved list. The inspection will, whenever possible, be conducted jointly by two persons, one of whom shall be an officer of the Education Department to be appointed by the Director of Public Instruction and the other appointed by the Syndicate. The report of the Inspectors with the observations of the Director of Public Instruction will be considered by a Committee which will be constituted as follows :—

(a) The Vice-Chancellor. *Chairman.*

(b) The Director of Public Instruction, Bengal, or one of his nominees.

(c) Principal, David Hare Training College.

(d) University Inspector of Colleges.

(e) A representative of the Teachers' Training Department of the University nominated by the Syndicate.

(f) Two Members of the Senate nominated by the Syndicate.

(g) One Inspector of Schools nominated by the Syndicate and approved by the Director of Public Instruction, Bengal.

One lady member may be co-opted to the Committee, if there is no such member on the Committee otherwise.

The Syndicate may grant approval to schools on the recommendation of the Committee mentioned above ordinarily for a period of three years at a time. The Syndicate may also refer back the recommendation to the Committee for reconsideration.

The duties of the officers who will inspect such school from time to time shall be—

(i) to satisfy themselves that the school continues to fulfil conditions originally imposed and the library contains the scheduled books;

(ii) to report whether the intending candidates are receiving instructions both theoretical and practical according to proper standard.

## CHAPTER XL-E

### DIPLOMA IN DOMESTIC SCIENCE TRAINING

1. An examination for the Diploma in Domestic Science Training shall be held annually in Calcutta and at such other places as shall, from time to time, be appointed by the Syndicate, and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate may be admitted to the examination who has passed the Intermediate Examination with Chemistry and has prosecuted a regular course of study in an institution recognised for this purpose for not less than one academical year.

Any candidate may be admitted to the examination who has passed the Intermediate Examination without Chemistry and has prosecuted a regular course of study as aforesaid if he has served as a *bona fide* teacher of Domestic Science in an institution, either approved by Government or recognised by the University, for a period of not less than two years.

3. Every candidate for the Diploma Examination in Domestic Science Training shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate, at least six weeks before the date fixed for the commencement of the examination.

4. A fee of Rs. 30 shall be forwarded by each candidate with his application.

A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee; but such a candidate may be admitted to one or more subsequent examinations for the Diploma in Domestic Science Training on payment of a like fee of Rs. 30.

5. Every candidate shall be examined in the following theoretical and practical portions of the course :—

#### *Theoretical*

- |  |                |
|--|----------------|
| (i) Theory and Practice of Teaching<br>including School Organisation | ... One Paper. |
| (ii) Home Life and Child Psychology                                  | ... One Paper. |
| (iii) Hygiene and Home Nursing                                       | ... One Paper. |

(iv) Theory and Practice of Domestic Science as detailed below—

- |   |                     |
|---|---------------------|
| (a) Home Organisation, House Craft and Laundry work | ... One Paper.      |
| (b) Cookery and Dietetics                           | ... One Half Paper. |
| (c) Needlework and Designing                        | ... One Half Paper. |

### *Practical*

- (i) Practical work in connection with (a), (b) and (c) of Sub-Section (iv), Section 5 100 marks.  
For (a) 50 marks, (b) 25 marks and (c) 25 marks.

- |  |               |
|--|---------------|
| (ii) Teaching (one lesson to be given) | ... 50 marks. |
| (iii) Record of year's work            | ... 50 marks. |

The Syndicate shall have power to modify or add to the above list on the recommendation of the Board of Studies in Teaching.

Detailed syllabus in the different subjects shall be laid down and books prescribed, from time to time, by the Syndicate on the recommendation of the Board of Studies in Teaching.

6. There shall be a written examination in each of the theoretical subjects (i) to (iv) under Section 5, and the candidates will have the option of answering the papers either in English or in Bengali or in such other language as may be prescribed by the Syndicate.

Each full paper shall be of three hours and carry 100 marks. Each half paper shall be of two hours and carry 50 marks

7. In connection with the examination in the practical portion, oral questions may be asked on any of the practical subjects and the candidates will have the option of answering those orally either in English or in Bengali or in such other language as may be prescribed by the Syndicate.

The marks allotted for the year's record shall be given by the Head of the Institution in which the candidate has studied.

8. The candidate will be required to prepare, for presentation to the examiners, at least a week before the final Practical Examination, full teaching notes of three lessons in any three subjects under (a), (b) and (c) of sub-section (iv), Section 5. The examiners shall decide which one of the lessons prepared by the candidates shall be given.

The examiners may require a candidate to give an extra lesson if, in their judgment, such a lesson is necessary.

9. Each candidate shall give a number of lessons on the subjects (a), (b) and (c) of sub-section (iv), Section 5, in a class or classes in selected schools, under supervision. The number

of lessons may be decided by the Principal of the institution, but shall in no case be less than 20.

All lesson notes shall be preserved and be available to the examiner at the time of the final practical test in 'Teaching.'

10. In order to pass a candidate must obtain 40 per cent. in each of the theoretical subjects (i) to (iv) under Section 5, the subjects (a), (b) and (c) under (iv) being treated as separate subjects; and also 40 per cent. in each of the practical portions (i), (ii) and (iii) under Section 5.

Candidates obtaining at least 420 marks shall be declared to have passed with Distinction, and those obtaining 280 marks shall be declared to have passed.

11. As soon as possible after the examination the Syndicate shall publish a list of successful candidates. The names of those who have passed with Distinction will be arranged in order of merit. The names of other successful candidates will be published in alphabetical order.

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## CHAPTER XLI

### BACHELOR OF LAW

1. Every candidate for the Degree of Bachelor of Law shall satisfy the following conditions:—

- (i) He must have passed the Examination for the Degree of Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering.
- (ii) He must, after passing that examination, have prosecuted a regular course of study, as explained in Regulation 2, for not less than three academical years in a college affiliated in Law.
- (iii) He must pass three examinations in Law, namely.
  - (a) Preliminary Examination, not earlier than the end of the first-year of law study.
  - (b) Intermediate Examination, not earlier than the end of the second-year of law study.
  - (c) Final Examination, not earlier than the end of the third-year of law study.

Provided that a candidate who has been placed in the First Division at the Preliminary Examination may take the Final Examination in the middle of the third-year of his law study, if during the year and half which elapses after he has passed the Preliminary Examination, he has attended the full course prescribed for the Intermediate and Final Examinations.

All the three examinations shall be held six-monthly but, subject to the exception mentioned in Regulation 11, no candidate shall be admitted to the Intermediate Examination until six months after he passes the Preliminary Examination.

2. No candidate shall be considered to have prosecuted a regular course of study unless he has attended—

- (i) at least three-fourths of the full number of lectures in each subject or group of subjects mentioned in Regulation 4, as forming the subject of a separate paper (such full number not being less than 32);
- (ii) at least three-fourths of the full number of sittings of a Moot Court in each of the said subjects or groups of subjects [other than subjects (i) and (ii) for the Preliminary Examination] (such full number not being less than 12).

3. The Preliminary, Intermediate and Final Examinations shall be written and may also be partly oral.

4. The following shall be the subjects for the Preliminary, Intermediate and Final Examinations, respectively:—

#### FOR THE PRELIMINARY EXAMINATION

- |       |                    |     |                   |
|-------|--------------------|-----|-------------------|
| (i)   | Jurisprudence      | ... | <i>One Paper.</i> |
| (ii)  | Roman Law          | ... | <i>One Paper.</i> |
| (iii) | *Hindu Law         | ... | <i>One Paper.</i> |
| (iv)  | Constitutional Law | ... | <i>One Paper.</i> |

#### FOR THE INTERMEDIATE EXAMINATION

- |       |  |     |                   |                   |
|-------|--|-----|-------------------|-------------------|
| (i)   | Mahomedan Law                              | }   | ...               | <i>One Paper.</i> |
|       | and  |     |                   |                   |
| (ii)  | The Law relating to Persons                |     |                   |                   |
| (iii) | The Law relating to Property, including    |     |                   |                   |
|       | (a) the Law of Transfer <i>inter vivos</i> | ... | <i>One Paper.</i> |                   |
|       | and  |     |                   |                   |
|       | (b) Principles of the English Law of       |     |                   |                   |
|       | Real Property and the Law of               |     |                   |                   |
|       | Intestate and Testamentary                 |     |                   |                   |
|       | Succession (exclusive of the               |     |                   |                   |
|       | Hindu and the Mahomedan                    |     |                   |                   |
|       | Law of Intestate Succession)               | ... | <i>One Paper.</i> |                   |
| (iv)  | The Law of Contracts and Torts             | ... | <i>One Paper.</i> |                   |

#### FOR THE FINAL EXAMINATION

- |       |  |        |                   |
|-------|--|--------|-------------------|
| (i)   | The Law relating to Property, including the Law of Land Tenures, Land Revenue and Prescription | ...    | <i>One Paper.</i> |
| (ii)  | The Principles of Equity, including the Law of Trusts  | ...    | <i>One Paper.</i> |
| (iii) | The Law of Evidence and the general principles of Civil Procedure and Limitation               | ... .. | <i>One Paper.</i> |
| (iv)  | The Law of Crimes and the general principles of Criminal Procedure                             | ...    | <i>One Paper.</i> |

\* Candidates from Burma will be allowed optionally to offer "Burmese Buddhist Law" in place of "Hindu Law."

5. The limits of each subject mentioned in the preceding regulation shall be indicated by the Syndicate from time to time by reference to text-books, and Legislative Acts and Statutes where necessary. The Syndicate shall also prescribe, in connection with each subject [other than subjects (i) and (ii) for the Preliminary Examination] a list of leading cases to be studied in the original judgments as expositions of important legal principles. Every College affiliated in Law shall make suitable provision for a Law library so as to enable its students to have access to the reports or other books in which the selected cases may be found.

6. A Preliminary Examination, an Intermediate Examination and a Final Examination in Law shall be held six monthly in Calcutta and in such other places as the Syndicate may, from time to time, determine and shall commence at such time as the Syndicate may fix, the approximate dates to be notified in the Calendar.

7. Any Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering, who has, after passing his Degree Examination, prosecuted a regular course of study as explained in paragraph 2, so far as the subjects for the Preliminary Examination in Law are concerned, may be admitted to that examination, if he sends to the Registrar his application with a fee of thirty rupees and with a certificate in the form prescribed by the Syndicate, at least thirty days before the date fixed for the commencement of the examination.

A candidate, who fails to pass or present himself for examination, shall not be entitled to obtain a refund of the fee.

9. Any student who has passed the Preliminary Examination the Syndicate shall publish a list of the names of the successful candidates arranged in two divisions, the first in order of merit and the second in alphabetical order.

The first student of the first division shall be entitled to a prize of books of the value of Rs. 100, and the second student of the first division shall be entitled to a like prize of Rs. 50.

9. Any student who has passed the Preliminary Examination and has prosecuted a regular course of study as explained in paragraph 2, so far as the subjects for the Intermediate Examination in Law are concerned may be admitted to that examination, if he sends to the Registrar his application with a fee of thirty rupees and with a certificate in the form prescribed by the Syndicate, at least thirty days before the date fixed for the commencement of the examination.

A candidate who fails to pass or present himself for examination shall not be entitled to a refund of the fee.

10. As soon as possible after the Intermediate Examination, the Syndicate shall publish a list of the names of the successful candidates arranged in two divisions, the first in order of merit, and the second in alphabetical order.

The first student of the first division shall be entitled to a prize of books of the value of Rs. 100, and the second student of the first division shall be entitled to a like prize of Rs. 50.

11. A student may, during the second year of his Law study, prosecute a regular course of study as explained in paragraph 2, in the subjects for the Intermediate Examination, notwithstanding that he has not already passed the Preliminary Examination. And no student shall be debarred from prosecuting such regular course of study, in the subjects for the Final Examination in the third-year of his Law study, by reason of his failing to pass or present himself for the Preliminary Examination at the end of the first year or the Intermediate Examination at the end of the second year. But no one who is not a Master of Arts or Science shall be admitted to the Intermediate Examination until six months after his passing the Preliminary Examination.

12. Any Bachelor of Arts or Bachelor of Science or Bachelor of Commerce or Bachelor of Medicine or Bachelor of Engineering, who has after passing his Degree Examination, prosecuted a regular course of study as explained in Regulation 2, for three years or two years and a half, as the case may be, and has passed the Preliminary Examination, may be admitted to the Final Examination in Law, if he sends his application with a fee of thirty rupees and with certificates in the form prescribed by the Syndicate, to the Registrar, at least thirty days before the date fixed for the commencement of the examination :

Provided that if such candidate has not previously passed the Intermediate Examination, he must at the same time appear at the Intermediate Examination in accordance with paragraph 9.

And any one who has prosecuted a regular course of study as above mentioned, and who, as a Master of Arts or Science, is entitled under the exception in paragraph 11 to present himself for the Preliminary, Intermediate and Final Examinations in the same year, may be admitted at the same time at the three examinations, if he sends his applications with the prescribed fees and with certificates in the prescribed forms to the Registrar, at least thirty days before the date fixed for the commencement of the earliest of these examinations.

A candidate under any of the preceding paragraphs who fails to pass or present himself for examination shall not be entitled to obtain a refund of the fee.

13. As soon as possible after the Final Examination, the Syndicate shall publish a list of the names of the successful candidates arranged in two divisions, each in order of merit. The first student of the first division shall be entitled to a gold medal and a prize of books to the value of Rs. 200. provided that he was placed in the first division also at either the Preliminary or the Intermediate Examination.

13A. If a student after completion of a regular course of study for any one of the Law examinations does not register himself as a candidate for or present himself at the examination immediately succeeding such completion, he may appear at any of the three following examinations of the same standard, provided he produces, in addition to the ordinary certificate or certificates as required by the Regulations, a certificate from the Principal of the College at which he last studied or from a Member of the Senate testifying to his good character during the intervening period.

If such student does not register himself as a candidate for or appear at any of the three examinations immediately succeeding the examination following the completion of his regular course of study as aforesaid, he may appear at any of the three subsequent examinations of the same standard, provided he produces a certificate testifying to his good character during the intervening period as above and provided further that he prosecutes a fresh course of study for at least six months immediately preceding the examination at which he presents himself.

If such student desires to present himself at any subsequent examination he shall be required to prosecute a fresh course of study for the full period in accordance with the Regulations.

All students appearing or registering themselves at any examination under these regulations after first three chances shall be deemed to be non-collegiate students.

If a student after completion of his regular course of study registers himself as a candidate for his examination and appears at the examination but fails to complete it on account of illness or any other reasons considered sufficient by the Syndicate, the above rules may be applied to the cases of such students by the Syndicate.

These regulations may, for reasons considered sufficient by the Syndicate, be made applicable in the case of a student who having been allowed to appear at any of the Law Examinations as a non-collegiate student on account of shortage of attendance at lectures does not register himself as a candidate for or

present himself at the examination immediately succeeding the session or sessions in which he attended lectures. All such students appearing under the first and second paragraphs above will be treated as non-collegiate students.

14. If a candidate who is admitted to the Intermediate and Final Examinations at the same time, succeeds in the former and fails in the latter, he shall be declared to have passed the Intermediate Examination, and he may be admitted to any subsequent Final Examination on payment of the prescribed fee. But if he succeeds in the Final Examination and fails in the Intermediate Examination, he shall be deemed to have failed in both and he may be subsequently admitted to the two examinations at the same time on payment of the prescribed fees.

If a candidate is a Master of Arts or Science and is admitted as such to the Preliminary, Intermediate and Final Examinations at the same time, he shall be declared to have passed the examination or examinations in which he succeeds, provided that he shall not be declared to have passed the Intermediate Examination, unless he has passed the Preliminary Examination as well, nor shall he be declared to have passed the Final Examination unless he has passed both the Preliminary and Intermediate Examinations. In the event of failure he may be admitted to one, two or three of these examinations, as the case may be, at the same time on payment of the prescribed fees.

The admission of a candidate who fails in any of the Law Examinations to one or more subsequent examinations of the same standard shall be governed by the provisions of Section 13A.

15. For the Preliminary Examination four papers shall be set, each of three hours and carrying 100 marks.

For the Intermediate Examination four papers shall be set, each of three hours and carrying 100 marks.

For the Final Examination four papers shall be set, each of three hours and carrying 100 marks.

16. In the third paper for the Preliminary Examination and in every paper for the Intermediate and Final Examinations, 40 marks shall be allotted to questions framed with a view to test the ability of candidates to apply the more important legal principles to concrete cases. Full credit shall be given for well-reasoned answers to such questions, even if the conclusions happen to differ from the views taken in decided cases. No credit shall be given for bare answers unsupported by arguments.

17. In order to pass the Preliminary Examination, a candidate must obtain—

In each paper	...	...	30 <i>marks</i> .
and in the aggregate	...	...	200 <i>marks</i> .
In order to be placed in the first division, a candidate must obtain—			267 <i>marks</i> .

18. In order to pass the Intermediate Examination, a candidate must obtain—

In each paper	...	...	30 <i>marks</i> .
and in the aggregate	...	...	200 <i>marks</i> .
In order to be placed in the first division, a candidate must obtain—			267 <i>marks</i> .

19. In order to pass the Final Examination, a candidate must obtain—

In each paper	...	...	30 <i>marks</i> .
and in the aggregate	...	...	200 <i>marks</i> .
In order to be placed in the first division, a candidate must obtain—			267 <i>marks</i> .

20. Any candidate who has failed in one paper only at any of the three examinations, and by not more than 5 marks and has shown merit by gaining 60 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass. In order to determine the division in which such a candidate shall be placed and his place in the division, the number of marks by which he has failed in one paper shall be deducted from his aggregate.

If the examiners are of opinion that in the case of any candidate at any of these examinations not covered by the preceding Regulation, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate.

21. Each successful candidate at the Preliminary and the Intermediate Examinations shall receive a certificate in the form entered in Appendix A.

Each successful candidate at the Final Examination shall receive with his Degree of B.L. a diploma in the form entered in Appendix A, setting forth the division in which he was placed.

22. For the purpose of Section 13A, a student shall be deemed to have completed his regular course of study (a) for the Preliminary Examination at the end of the first-year of his Law study; and (b) for both the Intermediate and the Final Examinations, at the end of the third-year of his Law study.

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## CHAPTER XLII

### MASTER OF LAW

1. An Examination for the Degree of Master of Law shall be held annually in Calcutta, commencing at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any candidate who has obtained the Degree of Bachelor of Law may be examined for the Degree of Master of Law.

3. Every candidate shall send his application with a fee of two hundred rupees to the Registrar at least three months before the date fixed for the commencement of the examination. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee.

4. Every candidate shall be examined in the following subjects:—

- (1) Hindu Law or Mahomedan Law.
- (2) Jurisprudence and Principles of Legislation.
- (3) Principles and History of Roman Law.
- (4) Private International Law.
- (5) and (6) Any two of the following subjects, namely:—
  - (i) Principles of Equity.
  - (ii) The Law relating to the Transfer of Immovable Property and the Law of Prescription.
  - (iii) The Law relating to Wills.
  - (iv) The Law of Contracts and Torts.
  - (v) Principles and History of the Law of Real and Personal Property.
  - (vi) Principles and History of the Law of Evidence.
  - (vii) History of English Law.

5. Six papers shall be set to each candidate, one on each of the six subjects. Each paper shall be of three hours and shall carry 100 marks.

There shall be a *viva voce* examination of each candidate, if the examiners think fit.

6. As soon as possible after the examination, the Syndicate shall publish a list of the candidates who have passed, arranged in two classes, each in order of merit. Candidates

shall be bracketted together, unless the examiners are of opinion that there is clearly a difference in their merits.

7. Each successful candidate shall receive with his Degree of M.L. a diploma in the form entered in Appendix A, setting forth the class in which he was placed. The candidate who is placed first in the first class shall receive a gold medal and a prize of books to the value of Rs. 200.

8. In order to pass the examination for the Degree of Master of Law, a candidate must obtain—

In each paper	...	... 50 marks.
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In order to be placed in the first class, a candidate must further obtain—

In the aggregate	...	... 400 marks.
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9. The examiners shall have regard to the style and method of the answers submitted by the candidates, and shall give credit for excellence in these respects.

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## CHAPTER XLIII

### DOCTOR OF LAW

1. Any Master of Law of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Law, provided one year has elapsed from the time when he passed the examination for the Degree of Master of Law.

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Master of Law, upon a knowledge of which he rests his qualification for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed upon some branch of law, or of the history or philosophy of law. The candidate shall indicate generally in a preface to his thesis and specially in notes, the sources from which his information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and, in what respects his investigations appear to him to advance the study of law.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of the science or study of law whether published conjointly or independently and upon which he relies in support of his candidature.

4. No application shall be entertained unless two members of the Faculty of Law or two Doctors of Law shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Law, the candidate has practised his profession with repute for five years, and that in habits and character, he is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 200. No candidate who fails to pass or present himself for examination shall be entitled to claim a refund of the fee.

6. The thesis mentioned in Regulation 2 and the original contributions, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board consisting of the Dean of the Faculty of Law and two other persons.

7. If the thesis is approved by the Board, and if the candidate has obtained a first class at the examination for the

Degree of Master of Law, he shall not be required to submit to any further written examination; but he may be required by the Board, at their discretion, to appear before them to be tested orally with reference to the thesis, and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral examination, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Law, they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of the science or study of law.

8. If the candidate is a person who has obtained a second class at the examination for the Degree of Master of Law, and if his thesis is approved by the Board, he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate, and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the written examination, and also of the oral examination, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Law, they shall cause his name to be published, with the subject of his thesis, and the titles of the published contributions (if any) to the advancement of the science or study of law.

9. In the case of a candidate falling under the preceding Regulation, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of the science or study of law, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and grounds of such exemption.

10. A diploma under the seal of the University, and signed by the Vice-Chancellor, shall be delivered at the next Convocation for conferring Degrees to each candidate who has qualified for the Degree.

11. Every candidate shall be at liberty to publish his thesis, and the thesis of every successful candidate shall be published by the University with the inscription: "Thesis approved for the Degree of Doctor of Law in the University of Calcutta."

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## CHAPTER XLIV

### FIRST M.B. EXAMINATION

1. Any undergraduate of the University may be admitted to this examination provided he has fulfilled the following conditions:—

(a) That he has attained the age of seventeen years or will attain that age on the 31st December of the year of his admission.

(b) That he has either (i) passed the Intermediate Examination in Science with Physics, Chemistry and Biology (*including* practical tests) or (ii) after passing the Intermediate Examination in Science with Physics and Chemistry (*including* practical tests) but without Biology, completed a six months' course in a college recognised in Biology and passed a University Examination of the same standard as prescribed in Chapter XXXV of the Regulations in Biology. Such instruction in Biology may be taken by the candidate simultaneously with the studies for the First M.B. Examination.

*N.B.—The provision for instruction in Biology along with the First M.B. course is only a temporary measure.*

(c) That he has attended a regular course of study, theoretical and practical, in the subjects of the examination for not less than two years at a College of Medicine affiliated to the University up to the standard of First M.B. Examination.

2. The examination shall be held twice in each year ordinarily in April and November, and shall commence on such dates as the Syndicate shall determine. Every candidate for admission to this examination, shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate and the fee of Rupees Fifty, at least twenty-one days before the date fixed for the commencement of the examination. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee.\* A candidate may be admitted to one or more subsequent examinations on payment of a like fee on each occasion, on producing a certificate that he has, since the date of last examination and

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\* The following rule was adopted during the period of emergency :—  
“ A candidate who fails in one subject only in the First M.B. Examination (under the new Regulations) may be re-examined in that subject at the next examination. If he fails again he shall have to appear in all the subjects at a subsequent examination.”

within the six months preceding his re-examination, attended, to the satisfaction of the Principal of his college, a further course of study in all the subjects for that examination provided that after four failures within two years, he shall not be admitted to the examination except on the special recommendation of the Principal of the college.

3. Every candidate shall be examined in the following subjects:—

- (i) Organic and Physical Chemistry.
- (ii) Anatomy.
- (iii) Physiology.
- (iv) Toxicological Chemistry and Elementary Pharmacology (*Materia Medica* and Practical Pharmacy).

The examination shall be written, oral and practical, three hours being allowed for each paper. In assessing marks the Examiners will take into account the duly attested records of the work done by the candidate.

The examination in *Organic and Physical Chemistry* shall consist of—

- (a) One theoretical paper, (b) a practical examination, and
- (c) an oral examination.

The examination in *Anatomy* shall consist of—

- (a) Two theoretical papers, (b) dissection, and (c) an oral examination.

The examination in *Physiology* shall consist of—

- (a) Two theoretical papers, (b) a practical examination, and
- (c) an oral examination.

The examination in *Toxicological Chemistry and Elementary Pharmacology* shall consist of—

- (a) One theoretical paper, (b) a practical examination, and
- (c) an oral examination.

Candidates who passed the B.Sc. Examination with Chemistry will be excused attendance at lectures and practical work in Organic and Physical Chemistry as also examination (Theoretical, Practical and Oral) in that subject.

4. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order. Every candidate shall, on passing, receive a certificate in the form entered in Appendix A. Candidates who obtain at least 75 per cent. of marks in any subject, shall be deemed to have passed with Honours in that subject provided that the candidate passes the examination in his first attempt.

On the recommendation of the Examiners in a particular subject a gold medal may be awarded to the candidate who has

particularly distinguished himself in Honours in that subject for that examination.

5. The full marks for each subject and the minimum marks required for passing shall be as follows:—

Subject	Written	Oral	Practical
Organic and Physical Chemistry ...	100	50	50
Anatomy ...	200	100	100
Physiology, including Histology, Bio-Chemistry, Experimental Physiology and Bio-Physics. ...	200	100	100
Toxicological Chemistry and Elementary Pharmacology (Materia Medica and Practical Pharmacy) ...	100	50	50

Pass marks in each subject are 50 per cent. in the aggregate, 50 per cent. in the practical, and 40 per cent. in the theoretical and oral.

C. The course of study for the First M.B. Examination shall be—

- (i) Organic and Physical Chemistry.
- (ii) Anatomy including Elements of Human Embryology and Genetics.
- (iii) Physiology.

(Note.—The demonstration of structure and function in the teaching of Anatomy and Physiology should be done as far as possible on the living human subject. Instruction in Anatomy should include information obtained from Radiology.)

- (iv) Toxicological Chemistry and Elementary Pharmacology.

(v) Elements of methods of Clinical Examination including Physical signs, the use of common instruments like Stethoscope, Ophthalmoscope, etc., and the examination of body fluids (with demonstration on living subjects normal and abnormal).

Note.—Instruction in the subjects included in (v) above illustrative of that given in Anatomy and Physiology and introductory to later studies, should be given as arranged by the teachers of Anatomy and Physiology and of the Clinical subjects throughout the Second-year. The amount of time to be allotted to these subjects should be approximately one-third of the total time available in that year.

7. Besides the subjects mentioned in Section 6, students shall obtain instruction in Elementary Pathology and Bacteriology during the latter part of the two years' course of studies for the First M.B. Examination.

This subject should include the normal reaction of the body to injury and infection as an introduction to General Pathology and Bacteriology.

No examination in the subject will be held at this stage.

## ORGANIC AND PHYSICAL CHEMISTRY

### *Theoretical*

Definition and recognition of Organic Compounds.

Isolation and preparation of Pure Organic Compounds.

Criteria of Purity. Determination of melting and boiling points.

Composition of Organic Compounds. Elementary detection of the elements—Carbon, Hydrogen, Nitrogen, Sulphur, Phosphorus, and the Halogens. Quantitative analysis, Calculation of results, Determination of molecular weights, Isomerism, Metamerism, Polymerism, Stereoisomerism.

Hydrocarbons. Saturated (Methane, Ethane).

Unsaturated series (Ethylene and Acetylene), Halogen derivatives of the Hydrocarbons (Chloroform, Carbontetrachloride, Iodoform). Alcohols—saturated and unsaturated series (Methyl, Ethyl, Amyl, Glycero and Allyl). Alcoholometry, Ethers (Ethyl ether).

Mercaptans and Sulphides (Ethyl mercaptan, Ethylsulphide).

Aldchydres (Formaldehyde, acetaldehyde, chloral).

Ketones (Acetone).

Fatty acids, saturated and unsaturated (formic, acetic, lactic, butyric, palmitic, stearic and oleic acids).

Oxalic, tartaric and citric acids.

Acetyl chloride, acetic anhydride.

Esters (Acetic ether and amyl nitrite).

Amines, Amides, the amino-acids (ethylamine, acetamide, glaccine, alanine, leucine, tyrosine).

Fats, oils and waxes, especially those relating to food-stuffs and medicine. Hydrogenation of fats. Saponification.

Carbohydrates. Their optical activity and classification (Glucose, fructose, glycuronic acid, cane sugar, maltose, lactose, starch, dextrin, glycogen, cellulose)

Cyanogen. Cyanides.

Purines (Uric acid, Caffeine, Urea).

Aromatic Compounds. Sources, preparation and properties of Benzene. Toluene, Benzene, Sulphonic acid, Nitrobenzene, Aniline, Benzyl-alcohol, Benzaldehyde, Benzoic acid, Phenol, Resorcinol, Salicylic acid, Pyrogallie acid, Gallic and Tannic acids, Picric acid, Naphthalene, Pyridine.



The whole course of Theoretical Chemistry will be treated in an elementary way and, as far as possible, experimentally, with special reference to the needs of medical students.

### *Practical*

This will consist of a course of practical demonstration and where feasible individual work by the student on—

Qualitative tests of C, H, N, S, P, and the Halogens in organic compounds.

General reactions and tests for methyl-alcohol, ethyl-alcohol, glycerol, chloral, ethyl-ether, formaldehyde, acetaldehyde, acetone, chloroform, carbon tetrachloride, iodoform, potassium cyanide, Saponification.

Reactions and qualitative tests for glucose, sucrose, lactose, starch, dextrin, urea, uric acid, phenol, lactic, salicylic, acetic, formic, citric, tartaric, oxalic, gallic, tannic and benzoic acids.

Candidates should have note-books of their laboratory work which must be duly certified by the Professor.

### PHYSICAL CHEMISTRY

A short course which shall include study of the following:—

Theory of Solution, Ionic theory, H-ion concentration—Buffers—Colloids—Osmosis—Surface tension, Catalysis, Mass action and reversible reactions.

### ANATOMY

A complete course of Human Anatomy including—

- (A) Dissection of the entire cadaver.
- (B) Anatomy of the living body.
- (C) Elements of human embryology.
- (D) Elements of Genetics (this may be taken with Biology).

### PHYSIOLOGY

I. A course of lectures on Physiology including instruction in Bio-Physics, Bio-Chemistry.

II. A practical course of Experimental Physiology (including Bio-Physics).

III. A practical course of normal Histology and the elements of Cytology.

IV. A practical course of Bio-Chemistry.

## TOXICOLOGICAL CHEMISTRY AND ELEMENTARY PHARMACOLOGY

### ELEMENTARY PHARMACOLOGY

#### *(Materia Medica and Pharmacy)*

General characters of drugs (vegetable and mineral), their composition, a knowledge of administration of drugs, channel of administration, knowledge of incompatibilities and the knowledge of the action of drugs in a general way.

### TOXICOLOGICAL CHEMISTRY

The detection of poisons, chemical and physiological tests. Toxicological Chemistry of the following poisons:—

Mineral Acids.

Corrosive Alkalies.

Carbolic Acid.

Corrosive Sublimate.

Oxalic Acid.

Salts of Copper, Lead, Antimony, Arsenic, Mercury, Phosphorus.

Alkaloids—like Morphine, Strychnine, Atropine, etc.

Glucosides—like Digitalin, Strophanthin, Amygdaline, etc.

Gums and Resins.

Snake Venoms.

Cyanogen group.

Kerosine Oil.

### ELEMENTARY PATHOLOGY AND BACTERIOLOGY

#### *Inflammation—*

Local reaction to injury—Nature of injurious agents—Cardinal signs of inflammation—Steps in inflammation—Suppuration—Ulceration—Repair—Regeneration. Demonstration of onset of inflammation in the mesentary or web of foot of frog.

#### *Infection—*

Systematic reaction to microbic injuries—Brief consideration of the vegetable and animal parasites which infect man—Channels of entry of infective organisms—Natural barriers to infection—Phagocytosis—Grades of infection—Mechanism of Cure—Fever—Blood changes—Immunity.

Demonstration of smear of pus, sputum and blood to show staphylococci, tubercle bacilli and malarial parasites.

Demonstration of phagocytosis of bacteria and foreign bodies.

Museum demonstration of some of the common pathological lesions.

The number of lectures and practical classes should be as follows:—

I. Organic and Physical Chemistry—Lectures, 30. Practical classes, 25 (of two hours each).

II. Anatomy—Lectures, 100 (2 courses of 50 lectures each).

III.(a) Physiology—Lectures, 100 (2 courses of 50 lectures each).

(b) Practical classes in Bio-Chemistry. 25 (of two hours each).

(c) Practical classes in Experimental Physiology, 25 (of two hours each).

(d) Practical classes in Histology, 25 (of two hours each).

IV. Pharmacology (Materia Medica, Practical Pharmacy and Toxicology)—25 lectures or demonstrations. Practical classes, 25.

V. Elementary Pathology and Bacteriology—20 lectures or demonstrations.

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## CHAPTER XLV

### FINAL M.B. EXAMINATION

1. Any candidate who fulfils the following conditions may be admitted to this examination:—

(a) That he has passed the First M.B. Examination at least three years previously.

(b) That he has completed a regular course of study, theoretical and practical, in the subjects of the examination extending over a period of at least three years, subsequent to his passing the First M.B. Examination in a College of Medicine affiliated to the University up to the Final M.B. standard

2. The Final M.B. Examination shall be divided into two parts, Part I and Part II, embracing subjects as defined below.

The examination in each Part shall take place twice in each year, ordinarily in April and November, and shall commence on such dates as the Syndicate shall determine. A candidate may either take up both parts together or one part only, either Part I or Part II. Every candidate for admission to the examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 40 for each Part of the examination, at least twenty-one days before the date fixed for the commencement of the examination. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee, but may be admitted to one or more subsequent examinations in that Part, on payment of the prescribed fee on each occasion, on producing a certificate that he has since the date of the last examination and within the six months preceding the examination which he intends appearing at, attended to the satisfaction of the Principal of the college, a further course of study in such of the subjects in which he had failed or did not appear at the previous examination.

3. Every candidate shall be examined in the following subjects:—

- Part I     ...     (i) Medicine including Applied Anatomy and Physiology Clinical Pathology and Therapeutics, Diseases of children, Tuberculosis, Skin diseases, Infectious diseases, and Psycho-Pathology.
- (ii) Applied Pathology, Bacteriology and Parasitology.

- (iii) Applied Pharmacology and Therapeutics.
  - (iv) Public Health and Hygiene.
  - (v) Forensic and State Medicine.
- Part II      ...      (i) Surgery, including Applied Anatomy and Physiology. Clinical Pathology, Radiology, Orthopædics and Venereal diseases, Dental diseases and Surgical diseases of infancy and childhood.
- (ii) Ophthalmology and Diseases of ear, nose and throat.
- (iii) Obstetrics and Gynæcology including Infant Hygiene

A candidate who fails to pass or to appear in any subject in Part II of the examination, may be re-examined in the subject or subjects in which he failed or did not appear within six months from the date of the last examination.

Three hours shall be allowed for each paper in each subject.

## PART I

The examination in *Medicine* shall consist of—

- (a) Two theoretical papers. An average of at least half an hour should be allowed to answer each question.
- (b) An oral examination.
- (c) A practical examination including an examination on pathological specimens, secretions, interpretation of X-Ray records, the testing of urine, clinical microscopy and prescription writing.
- (d) A clinical examination, at least one hour being allowed to the candidate for the examination of, and report on his principal case. The examination of secretions, the testing of urine, clinical microscopy and prescription writing should form a part of this examination.

The examination in *Applied Pathology* shall consist of—

- (a) A theoretical paper. An average of at least half an hour should be allowed to answer each question.
- (b) A practical examination.
- (c) An oral examination including questions on macroscopic and microscopic specimens.

The examination in *Applied Pharmacology and Therapeutics* shall consist of—

- (a) One theoretical paper. An average of at least half an hour should be allowed to answer each question.
- (b) An oral examination.

The examination in *Public Health and Hygiene* shall consist of—

(a) One theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) An oral examination.

The examination in *Forensic and State Medicine* shall consist of—

(a) One theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) An Oral examination.

## PART II

The examination in *Surgery* shall consist of—

(a) Two theoretical papers. An average of at least half an hour should be allowed to answer each question.

(b) A clinical examination, at least one hour being allowed to the candidate for the examination, and report on his principal case.

(c) An oral examination.

(d) A practical examination in which questions on the use of surgical instruments and appliances on the application of splints and bandages and on surgical pathology, interpretation of X-ray records and Pathological slides shall form a special part.

(e) Surgical anatomy and operation on the cadaver.

The examination in *Ophthalmology and Diseases of ear, nose and throat* shall consist of—

(a) One theoretical paper. An average of at least half an hour should be allowed to answer each question.

(b) A clinical examination and the candidate's reports on his principal cases.

(c) An oral examination.

The examination in *Obstetrics and Gynæcology* including *Infant Hygiene* shall consist of—

(a) Two theoretical papers. An average of at least half an hour should be allowed to answer each question.

(b) An oral examination.

(c) A practical examination on obstetrics and gynaecological operations and questions on specimens, models, instruments and appliances.

(d) A clinical examination.

*N.B.—In Midwifery the duly attested records of the work done by the candidates in Clinical Midwifery must be presented to the Examiners for assessment.*

4. As soon as possible after the examination in Part I or II, the Syndicate shall publish a list of candidates who have passed, arranged in alphabetical order. Candidates who obtain at least 75 per cent. of marks in any subject belonging to either Part I or II, shall be deemed to have passed with Honours in that subject provided that the candidate passes in all the subjects of that Part taken together in his first attempt.

On the recommendation of the Examiners in a particular subject a gold medal may be awarded to the candidate who has particularly distinguished himself in Honours in that subject for that examination.

5. A candidate who fails to pass either in Part I or Part II of the Final M.B. Examination may be re-examined in that Part provided he completed the two portions of the Final Examination within a period of nineteen months. If he fails to present himself for re-examination or if he fails to pass within the period of nineteen months, he shall be re-examined in both Parts I and II.

6. The full marks for each subject and minimum marks required for passing are as follows:—

#### PART I

Subjects	Written	Oral	Practical	Clinical
Medicine ... ..	200	100	100	100
Applied Pathology ...	100	50	50	...
Applied Pharmacology and Therapeutics ...	100	50	...	...
Public Health and Hygiene ...	100	50	...	...
Forensic and State Medi- cine ...	100	50	...	...

Pass marks in each subject are 50 per cent. in the aggregate and 50 per cent. in the practical, 50 per cent. in the clinical and 40 per cent. in the written and oral.

*Note.*—For purposes of assessing pass marks in *Medicine* the marks obtained by the candidate in the *Written* and *Oral* portion of the examination in *Applied Pharmacology and Therapeutics* should be added to the marks obtained in the corresponding portions of the examination in *Medicine*.

## PART II

Subjects	Written	Oral	Practical	Clinical
Surgery ...	200	100	100	100
Ophthalmology, Diseases of ear, nose and throat ...	100	50	...	50
Obstetrics and Gynaecology including Infant Hygiene ...	200	100	100	100

Pass marks in each subject are 50 per cent. in the aggregate and 50 per cent. in the practical, 50 per cent. in the clinical and 40 per cent. in the written and oral.

*Note.*—For purposes of assessing pass marks in *Surgery* the marks obtained by the candidate in the *Written*, *Oral* and *Clinical* portions of the Examination in *Ophthalmology and Diseases of ear, nose and throat* should be added to the marks obtained in the corresponding portions of the examination in *Surgery*.

7. During the clinical period, occupying the 3rd-, 4th- and 5th-year of study in a medical college, the student shall receive instruction in the subjects of Part I and Part II of the Final M.B. Examination.

## PART I

A. Medicine including Applied Anatomy and Physiology, Clinical Pathology and Therapeutics, Children's Diseases, Skin Diseases, Mental Diseases.

B. Applied Pathology and Bacteriology, Theoretical and Practical, which latter should be continued throughout the period of clinical studies including the study of:—

- (a) General and Special Pathology and Morbid Anatomy.
- (b) Clinical and Chemical Pathology.
- (c) General and Clinical Bacteriology and Parasitology.
- (d) Immunology and Immunisation.
- (e) Practical instruction on the conduct of necropsies with a certificate of having acted as post-mortem clerk in at least 10 cases.

C. Applied Pharmacology and Therapeutics.

D. Forensic and State Medicine.

E. Hygiene and Public Health.



## PART II

- A. Surgery including Applied Anatomy and Physiology, Clinical Pathology, Orthopædics, Dental and Venereal Diseases.
- B. Ophthalmology, Diseases of ear, nose and throat.
- C. Gynæcology and Obstetrics including Infant Hygiene.

## MEDICINE

A. A course of systematic instruction in the principles and practice of Medicine.

B. A medical clinical clerkship for a period of nine months of which six months must be spent in the hospital wards and three months in the out-patient department.

*Note.*—It is expected that each student will be given charge of five beds while doing clinical clerkship in the indoor wards.

C. A clinical clerkship for one month in a children's ward or hospital, or in an out-patient department.

D. During the period of medical ward-clerking a period of one month as an intern-clerk during which the student is in residence in hospital or close by.

E. Lectures or demonstrations in clinical medicine and attendance on general in-patient and out-patient practice during at least two years which may run concurrently with the surgical practice under Surgery (D).

F. Instruction in Therapeutics and Prescribing, including (i) Applied Pharmacology, (ii) methods of treatment by vaccines and sera, (iii) physiotherapy and (iv) dietetics.

Principles of nursing.

G. Instruction in Applied Anatomy and Physiology throughout the period of clinical studies, to be arranged between the teachers of Anatomy and Physiology and of the clinical subjects.

H. Instruction throughout the period of medical clerkship in Clinical Pathology, to be arranged by the teachers of Pathology and of the clinical subjects.

I. Instructions in—

Diseases of infants.

Acute infectious diseases.

Tuberculosis.

Psychopathology and mental diseases.

Diseases of the skin.

Radiology and Electro-therapeutics in their application to Medicine.

Theory and practice of vaccination.

*Note.*—(1) Throughout the whole period of study the attention of the students should be directed by the teachers of this subject to the importance of its preventive aspects.

(2) *Instruction in these branches of medicine should be directed to the attainment of sufficient knowledge to ensure familiarity with the commoner conditions, their recognition and treatment.*

## HYGIENE AND PUBLIC HEALTH

### *Theoretical*

(a) Hygiene—A concept, not a subject. The three divisions of the science and art of medicine—curative medicine, preventive medicine or hygiene and constructive medicine. Practical application of the principles of Hygiene to the community is Public Health Work. The part that the general practitioner should play in all three.

(b) 'Individual' and 'Environmental' hygiene, the principles underlying each.

(c) 'Individual' Hygiene.—The main factors relating to the production and maintenance of health in the individual throughout life (ante-natal, natal, infancy, childhood, manhood, middle age and old age periods). The importance of proper nutrition, work, recreation, sleep, rest and clothing in providing and preserving health of mind and body.

(d) Hygiene of the man's dwelling place—both urban and rural—selection of building sites and the principles regulating the sanitary construction, ventilation, warming and cooling of dwellings, living rooms—floor and cubical space for each adult and child, overcrowding, kitchen—outlet of smoke from the kitchen, use of suitable fuel, sanitary annexe, stores, open space for each dwelling place. Impurities in air, general effects of vitiated air and diseases produced by impurities in the air. Apartments, flats and bustees in the cities.

(e) Hygiene of the City.—Zoning of areas, residential trade, industrial, educational, etc. Control of smoke nuisance. Sources of water-supply. The collection, distribution and storage of water, including materials used for these purposes. The purification of water without filtration and with filtration. Filter beds and domestic filters. The collection and forwarding of water sample for chemical and bacteriological analysis. Sewage. Sewage removed by the water-carriage system and by the dry methods. The disposal of sewage cess-pools, bored hole latrines, domestic septic tanks, discharge into rivers or sea, chemical treatment, land treatment and biological treatment. The collection, removal and disposal of refuse.

(f) Hygiene of the Village.—Village water supply, wells, tube-wells and tanks. Removal and disposal of excretal and other refuse. Bored hole latrines and domestic septic tanks. Community plots for obtaining spoil earth, for manure-pits, pasture land and for play-ground; clearance of jungle and res-

triction of areas for bamboo groves. Elementary rural reconstruction and remodelling of villages. Protection against common infections and parasitic diseases. Health propaganda and adult education. Special emphasis to be given to Bengal and conditions prevailing in the province.

(g) Health of the Community.—Infective diseases, their causes and prevention. Prophylactic inoculation, vaccination, isolation, segregation and quarantine. Deodorants, antiseptics and disinfectants and the methods of employing disinfectants. Diseases of occupation. The legal obligations of medical practitioners under public health regulations. Organisation of medical and nursing services for the early diagnosis and preventive treatment of disease in connection with :—

- (i) Maternity and Child Work.
- (ii) School Hygiene Work.
- (iii) Industrial Hygiene Work.
- (iv) Venereal diseases.
- (v) Tuberculosis.
- (vi) Mental defectives.

(h) The production and spread of disease; spread by contact, by droplet infection, by environmental vehicles (air, water, food, insects, industrial materials).

(i) The main diseases in India and the factors operating in their production including deficiency diseases. Their prevention and the duties of the general practitioner regarding them.

Disinfection and insect destruction.

An elementary knowledge of the life-histories of the mosquito, sandfly, housefly, louse, tick flies and bed bug.

(j) The production of immunity. The prevention of disease by immunological methods.

(k) The meaning of the term Vital Statistics. The methods of collection in India. The meaning of the terms—birth rate, death rate, maternal mortality, infantile mortality, specific death rate; these rates in Bengal.

(l) A brief history of the development of the public health services in Great Britain and in India. An outline of public health organisation, Great Britain, India and International. The responsibilities and duties of the general practitioner in these services.

(m) An outline of the Sanitary and Public Health Services in Bengal, the Ministry of Health, the Director of Public Health and his staff, District Health Officers, Municipal Health Officers and Sanitary Inspectors. Relation between the health service and general practitioner.

(n) Lectures should be amplified as far as possible by demonstration with charts, diagrams, specimens and epidiascopes.

*Practical*

(a) Field demonstration should include visits to see the organisation of public water supplies, inspections of insanitary *bustees* and poorer dwellings and drawing up their survey reports.

Method of artificial ventilation, disposal of refuse and night-soil, dairies, anti-malaria works, disinfecting stations, organisations for prevention and control of epidemic diseases, vaccine depot, slaughter house, food markets (fish, meat, vegetables), eating shops, etc.—12 hours.

(b) Attendance (8 hours) at:—

(i) Maternity and child welfare centre	...	3 days.
(ii) School children	... ..	3 "
(iii) Chest clinics	... ..	3 "
(iv) Venereal clinic service	... ..	2 "
(v) Institution for the mentally defectives	... ..	2 "
(vi) Municipal Health Office	... ..	3 "
(vii) Rural Health Units	... ..	4 "

*Each day—5 hours.*

(c) Simple practical classes in which simple practical tests and practices should be carried out:—

(i) Sterilisation of water by Horrock's Water Testing Apparatus.

(ii) Physical examination of different kinds of disinfectants.

(iii) Disinfection—fumigation—formalin spray.

(iv) Use of oil spray and mop.

(v) Examination of milk—specific gravity—estimation of butter fat—adulteration with starch and sugar.

(vi) Different kinds of green vegetables.

(vii) Examination of mustard oil for the presence of oil of Argemones Mexicana.

(d) All medical institutions must possess a suitable Hygiene Museum for the practical benefit of the students.

*Note.—Instruction should aim at inculcating principles and outlook rather than details, and such instruction should not be confined to the teacher of Hygiene but should be given by every teacher throughout the whole curriculum.*

## FORENSIC MEDICINE

A course of lectures on Medical Jurisprudence dealing with—

(i) Medical evidence, with special reference to the Indian Evidence Act. Medico-legal report. Dying declarations.

Signs of death. Post-mortem stains. Rigor Mortis. Cadaveric spasm. Putrefaction in air and water.

Mummification, adipocere examination of the dead body. Post-mortem examination in medico-legal cases.

Age in its medico-legal relations. Development of the foetus. Changes after birth. The teeth. Ossification and Union of Epiphyses.

Identity of the living. Identity of the dead. Sexual characteristics of the skeleton.

Modes of dying. Causes of sudden death.

Death from Asphyxia, Hanging, Strangulation, Suffocation, Throttling, Drowning. Resuscitation from Drowning.

Mechanical injuries and wounds. Chemical, microscopical and spectroscopical examination of blood stains and other stains.

Death by burns and scalds. Death from lightning, electric current, heat-stroke and cold. Starvation—its causation, symptoms and post-mortem appearances. Medico-legal questions relating to pregnancy, delivery and abortion, infanticide, criminal offences, legitimacy.

(ii) Medico-legal aspects of the different forms of Insanity. Delusions, Illusions, Hallucinations, Criminal responsibility, Modes of placing lunatics under restraint. Medical certificates. Lunacy certificates. Examination of lunatics. Testamentary capacity. Feigned insanity. Placing habitual drunkards under restraint.

(iii) Toxicology, diagnosis and general treatment of poisoning. Evidence of poisoning in the dead. Local effects produced by poisons, disease and post-mortem changes. Preservation of Viscera for analysis. The detection of poisons, chemical and physiological tests.

Toxicology of the following poisons:—Mineral acids, Corrosive alkalies, Carbolic acid, Corrosive sublimate, Oxalic acid, Salts of Copper, Lead, Antimony, Arsenic, Mercury, Phosphorus; Opium, Cyanogen Compounds, Alcohol, Chloroform, Chloral Hydrate, Kerosine Oil, Carbon Dioxide, Carbon Monoxide, Sulphuretted Hydrogen, Strychnine, Aconite, Belladonna, Cannabis Indica, Nerium-Odorum, Cocaine, Calotropis Gigantea, Plumbago, Zeylanica, Snake Venom, Digitalis, Oleander, Strophanthin, Amygdalin, Salicin, Poisonous animal food (Ptomaine group).

(iv) Instruction on the duties which develop upon practitioners in their relation to the State and on the generally recognised rules of Medical Ethics. Attention should be called to all notices on these subjects issued by the General Medical Council.

*Note.—(1) Courses of instruction in Forensic Medicine, Hygiene and Public Health, should be given not earlier than the Fourth-year. These should include instruction in the duties*

*which devolve upon practitioners in their relation to the State and on the generally recognised rules of Medical Ethics.*

(2) *Attendance at not less than twelve medico-legal post-mortem examinations.*

## SURGERY

A. A course of systematic instruction in the principles and practice of Surgery.

B. A Surgical Dressership in the Hospital Wards for a period of nine months, of which six months must be spent in the hospital wards and three months in the out-patient department.

*Note.—It is expected that each student will be given independent charge of five beds while doing Surgical Dressership in the Indoor Wards.*

C. During the period of Surgical Ward Dressing a period of one month as an intern-clerk, during which the student is in residence in hospital or close by.

D. Lectures or demonstrations in clinical surgery and attendance on general in-patient and out-patient practice during at least two years, which may run concurrently with the medical practice under Medicine (E).

E. Practical instruction in surgical methods including physio-therapy.

F. Practical instruction in minor operative surgery on the living.

G. Instruction in the administration of anæsthetics.

H. A course of instruction in Operative Surgery.

I. Instruction in Applied Anatomy and Physiology throughout the period of clinical studies to be arranged between the teachers of Anatomy and Physiology and of the clinical subjects.

J. Instruction throughout the periods of surgical dressership in Clinical Pathology to be arranged by the teachers of Pathology and of the clinical subjects.

K. Instruction in the following subjects:—

- (i) Radiology and electro-therapeutics in their application to surgery.
- (ii) Venereal diseases.
- (iii) Orthopædics.
- (iv) Dental diseases.
- (v) Surgical diseases of infancy and childhood.

*Note.—(1) Throughout the whole period of study the attention of the student should be directed by the teachers of this subject to the importance of its preventive aspects.*

*(2) Instructions in these branches of Surgery should be directed to the attainment of sufficient knowledge to ensure familiarity with the commoner conditions, their recognition and treatment.*

### OPHTHALMOLOGY AND DISEASES OF EAR, NOSE AND THROAT

Lectures and clinical demonstrations in—

(i) Ophthalmology, including Refraction and the use of Ophthalmoscope, with hospital attendance for a period of three months.

(ii) Diseases of ear, nose and throat, including the use of otoscope, laryngoscope and rhinoscope.

### OBSTETRICS AND GYNÆCOLOGY INCLUDING INFANT HYGIENE

A. Courses of systematic instruction in the principles and practice of Obstetrics and Gynæcology and Infant Hygiene, including the applied anatomy and physiology of pregnancy and labour.

B. Lectures and demonstrations in clinical obstetrics, gynæcology, and infant hygiene and attendance on the practice of a maternity hospital or the maternity wards of a general hospital including (a) ante-natal care and (b) the management of the puerperium, and on in-patient and out-patient gynæcological practice for a period of at least three months.

This period should be devoted exclusively to instruction in these subjects, and should be subsequent to the medical clinical clerkship and the surgical dressership. Not less than two-thirds of the hours of clinical instruction should be given to Midwifery, including ante-natal care and Infant Hygiene.

C. Of this period of clinical instruction not less than one month should be spent as a resident pupil either in a maternity hospital or, in a hostel attached to a maternity hospital or to the maternity wards of a general hospital.

The students should during this month attend at least twenty cases of labour under adequate supervision. Should the number of cases attended during this month be less than twenty, the remainder must be attended as soon as possible thereafter.

A certificate, showing the number of cases of labour attended by the student in the maternity hospital, should be signed by a responsible Medical Officer on the staff of the hospital and should state—

(i) That the student has personally attended each case during the course of labour, making the necessary abdominal and other examinations under the supervision of the certifying officer who should describe his official position.

(ii) That satisfactory written histories of the cases attended, including, when possible, ante-natal and post-natal observations, were presented by the student and initialled by the supervising officer.

8. The lectures will be as follows:—

Medicine	... 80	
Mental Diseases	... 8	
Applied Pathology and Bacteriology	... 60	lectures or demonstra- tions.
Applied Pharmacology and Therapeutics	30	Do.
Hygiene and Public Health	... 30	Do.
Forensic Medicine	... 30	
Surgery	... 80	
Ophthalmology and Diseases of Ear, Nose and Throat	... 25	
(Ophthalmology—15 Diseases of Ear, Nose and Throat—10).		
Obstetrics and Gynæcology including prac- tical demonstrations	... 60	



## CHAPTER XLVI

### (INSTRUCTION AFTER PASSING FINAL M.B. EXAMINATION)

A student after having successfully passed the Final M.B. Examinations in Part I and Part II is required to attend a course of six months' practical clinical instruction in the wards of a hospital specially recognised for the purpose.

A part, not exceeding one month of the above-mentioned period, may be spent in a hospital for special diseases.

The hours of attendance at the hospital should not be less than an average of 18 hours per week.

On completion of the course of practical clinical instruction, the student shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate, for admission to the M.B. Degree and the Syndicate on being satisfied that he is qualified for admission to the degree shall cause his name to be published in the *Gazette*. He shall, thereupon, receive with his Degree of M.B. a certificate in the form given in Appendix A.

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## CHAPTER XLVI-A

### TRANSITORY REGULATIONS \*

#### M.B. EXAMINATIONS

1. In this Chapter, the phrase " new Regulations " shall be taken to mean the present body of Regulations.

The phrases " old Regulations " and " old Rules " shall be taken to refer respectively to the Regulations and Rules in operation on the date previous to that on which the new Regulations come into force.

2. Candidates, who pass the Preliminary Scientific, First, Second and Third M.B. Examinations under the old Regulations, may prosecute further studies under the new Regulations in accordance with the following scheme:—

#### *(a) Preliminary Scientific M.B. Examination*

Any candidate, who will come out successful at this examination, may appear at the First M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of lectures for two academical years in the prescribed subjects.

Such candidates will be exempted from appearing in Organic and Physical Chemistry at the First M.B. Examination.

#### *(b) First M.B. Examination*

Any candidate, who will come out successful at the First M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations provided he attends in an affiliated college a regular course of studies for three academical years in the prescribed subjects and provided further he passes in Pharmacology at the First M.B. Examination under the new Regulations before he appears for the Final M.B. Examination.

#### *(c) Second M.B. Examination*

Any candidate, who will come out successful at the Second M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for two academical years in the prescribed subjects.

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\* For Rules *vide* Appendix F.

Such candidates will be exempted from appearing in (1) Pharmacology and Therapeutics and (2) Pathology, Bacteriology and Parasitology at the Final M.B. Examination in Part I, under the new Regulations.

(d) *Third M.B. Examination.*

Any candidate, who will come out successful at the Third M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for one academical year in the prescribed subjects.

Such candidates will be exempted from appearing in—

- (i) Pathology, Bacteriology and Parasitology,
- (ii) Pharmacology and Therapeutics,
- (iii) Public Health and Hygiene, and
- (iv) Forensic and State Medicine,

at the Final M.B. Examination in Part I, under the new Regulations.

3. Candidates, who are unsuccessful at the Preliminary Scientific, First, Second and Third M.B. Examinations under the old Regulations, may prosecute further studies under the new Regulations on fulfilling the conditions as noted below:—

(a) Any candidate, who fails at the Preliminary Scientific M.B. Examination under the old Regulations, may appear at the First M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of lectures for two academical years in the prescribed subjects: provided further that he passes before appearing at the First M.B. Examination the practical test of the I.Sc. Examination of this University in those scientific subjects (excluding Mathematics) in which he had passed at the I.Sc. Examination before admission to a Medical College: provided also that he similarly passes in a Biological subject, both theoretical and practical, as required under section 1 (a) of Chapter XLIV unless he had previously passed in the theoretical portion of such Biological subject at the I.Sc. Examination.

(b) Any candidate, who fails in the First M.B. Examination under the old Regulations, may appear at the First M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for one academical year in the prescribed subjects.

Such a candidate will be exempted from appearing in Organic and Physical Chemistry at the First M.B. Examination.

(c) Any candidate, who fails in the Second M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for

three academical years in the prescribed subjects and provided further he passes in Pharmacology at the First M.B. Examination under the new Regulations before appearing at the Final M.B. Examination under the new Regulations.

(d) Any candidate, who fails in the Third M.B. Examination under the old Regulations, may appear at the Final M.B. Examination under the new Regulations, provided he attends in an affiliated college a regular course of studies for two academical years in the prescribed subjects.

Such a candidate will be exempted from appearing in Pathology, Bacteriology and Parasitology at the Final M.B. Examination, Part I, under the new Regulations.

4. Candidates, prosecuting studies under the old Regulations in 1939-40, may continue further studies under the old Regulations, and appear at the examinations under the old Regulations, to be held in the years noted below:—

(a) The Preliminary Scientific M.B. Examination, in accordance with the old Regulations and Rules, shall be held for the last time in November, 1941, and for this purpose these Regulations and Rules shall be deemed to be in force.

(b) The First M.B. Examination shall be held for the last time in April, 1945, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(c) The Second M.B. Examination shall be held for the last time in November, 1947, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(d) The Third M.B. Examination shall be held for the last time in April, 1950, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

(e) The Final M.B. Examination shall be held for the last time in November, 1952, in accordance with the old Regulations and Rules, which, for this purpose, shall be deemed to be in force.

5. Candidates who will appear at the various M.B. Examinations under the old Regulations during the transitory period will be required to attend lectures, theoretical and practical, the number of which will not exceed that prescribed under the new Regulations.

6. The Syndicate may pass orders for meeting special cases during the transitory period which may not be directly covered under the above Regulations.

7. The Rules and Regulations relating to the M.B. Examinations now in force shall remain operative subject to such modifications contained in this chapter.

## CHAPTER XLVI-B

The following classes of candidates will be permitted to appear at the Final M.B. Examination as non-collegiate students during the period of the War and three years thereafter on their fulfilling the conditions stated below :—

1. (a) A candidate who holds a License of a Diploma granted by an Examining Body in British India (other than the Universities) registerable under any of the Provincial Medical Council Acts and who has also passed the Matriculation Examination of this University or an Examination equivalent thereto or the Cambridge School Certificate Examination. provided that such a certificate shows that the candidate has passed at one and the same Examination in the following subjects :—

- (i) English Language or Literature.
- (ii) Mathematics (Elementary or Additional).
- (iii) A language other than English.
- (iv) Any other subject (except Religious Knowledge) mentioned in Groups I, II and III of the syllabus for such School Certificate Examination.

(b) A candidate who has held a Commission as a Medical Officer in His Majesty's Indian Army and applies for facilities for appearing at the M.B. Examination within 3 years after demobilisation, may be exempted from the operation of Section I of Chapter XLIV of the Regulations prescribing the preliminary qualification regarding general education, if, previous to commencing the study of medicine for the acquisition of qualifications registerable under the Provincial Medical Council Acts, he had passed an Examination in general education with Mathematics (Arithmetic, Algebra and Geometry) of the Matriculation standard.

2. Such a candidate must produce a certificate from the Principal of the college affiliated in Medicine to this University up to the Final M.B. standard to the effect that he has attended, in such a college for a period of at least six months, a course of instruction in the following subjects :—

Anatomy, Physiology, Materia Medica, Pharmacology including Bio-Chemistry.

3. He must also produce a certificate from the Principal of the college concerned of having attended for a period of not less than 24 months a course of studies in the subjects enunciated in Parts I and II under Regulation 3 of Chapter XLV.

Provided that the holder of any Diploma registerable under the Provincial Medical Council Acts, who had pursued medical studies for a period of at least 5 years, will be exempted from the course of instruction contemplated in (2) above and will be given concessions of six months in the period of 24 months' study mentioned in this Section.

Provided further that a Licentiate Officer of the I.A.M.C. who had received 3 months' intensive training at the Army Medical Training Centre at Poona and passed the Examination held after the course, will also be given concession of six months in the period of training mentioned in this Section.

4. He must have spent during this period of studies contemplated in (3) above, not less than 12 months or one academic year in clinical studies.

5. The provisions of the Regulations Nos. 2, 3, 4, 5 and 6 of Chapter XLV shall be applicable to him.

6. Every candidate shall, after passing the Final M.B. Examination in Parts I and II, receive with his Degree of M.B., a certificate mentioned in Chapter XLVI of the Regulations.

## CHAPTER XLVII

### DOCTOR OF MEDICINE

1. An examination for the Degree of Doctor of Medicine shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine may be admitted to this Examination on the production of certificates—

Of having subsequently to passing the M.B. Examination, completed, either three years' continuous practice of the Medical Profession or two years of Hospital practice.

Each of these periods shall be reduced by one year if the candidate be a Graduate with Honours in Medicine.

No application shall, however, be entertained unless two members of the Faculty of Medicine or two Doctors of Medicine shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine, the candidate has practised his profession with repute for the period specified, and that, in habits and character, he is a fit and proper person for the Degree of Doctor.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 200, at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of two hundred rupees on each occasion.

5. Every candidate shall be examined in the following subjects:—

Medicine (two papers, of which one may be a case for commentary).

Pathology (one paper).

Mental Diseases (one paper).

The examination shall be written, oral and practical, and shall also include a thesis.

6. A candidate for the Degree of Doctor of Medicine shall transmit to the Registrar not less than two months before the

commencement of the examination a thesis or published work embodying the result of independent research and having definite relation to the subjects of Medicine, Pathology or Mental Diseases. The candidate must indicate in what respects his thesis or research appears to him to advance medical knowledge or practice. The candidate may also submit any printed contribution or contributions to the advancement of Medical Science published independently or conjointly.

If the thesis or published work is approved by the Examiners, they will report on the same as "commended" or "highly commended." Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order with the titles of their theses and the opinions of the Examiners thereon placed against the name of each candidate. If in the opinion of the Examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate passing with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine may be admitted to the examination for the Degree of Doctor of Medicine in accordance with the conditions laid down in Regulations 5 and 6 and on producing certificates—

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University;
- (b) of having passed the examination in Zoology required for the Preliminary Scientific M.B. Examination;
- (c) of having practised the medical profession with repute for the period specified;
- (d) of being in habits and character a fit and proper person for the Degree of Doctor.



## CHAPTER XLVIII

### MASTER OF SURGERY

1. An examination for the Degree of Master of Surgery shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine may be admitted to this examination on production of certificates of having subsequently to passing the M.B. Examination, completed—

either three years' continuous practice of the medical profession;  
or two years of hospital practice.

Each of these periods shall be reduced by one year if the candidate be a Graduate in Medicine with Honours in Surgery.

No application shall, however, be entertained unless two members of the Faculty of Medicine or two Masters of Surgery shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine, the candidate has practised his profession with repute for the period specified, and that, in habits and character, he is a fit and proper person for the Degree of Master.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 200 at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of two hundred rupees on each occasion.

5. Every candidate shall be examined in the following subjects:—

- (1) Surgery (two papers, one of which may be a case for commentary).
- (2) Surgical Pathology and Surgical Anatomy (one paper).

- (3) Ophthalmology or any other branch of special Surgery that may be recognised by the University from time to time (one paper).
- (4) Operative Surgery and the use of instruments.

The examination shall be written, oral and practical.

6. A candidate for the Degree of Master of Surgery shall transmit to the Registrar, no less than two months before the commencement of the examination, a thesis or published work embodying the result of independent research and having definite relation to Surgery. The candidate must indicate in what respects his thesis or research appears to him to advance surgical knowledge or practice. The candidate may also submit any printed contribution or contributions tending to the advancement of Medical Science published independently or conjointly.

If the thesis or published work be approved by the Examiners, they will report on the same as "commended" or "highly commended." Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order, with the titles of their theses and the opinions of the Examiners thereon placed against the name of each candidate. If, in the opinion of the Examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate passing with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine may be admitted to the examination for the Degree of Master of Surgery, in accordance with the conditions laid down in Regulations 5 and 6 on producing certificates to the following effect—

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University;
  - (b) of having passed the examination in Zoology required for the Preliminary Scientific M.B. Examination;
  - (c) of having practised the Medical profession with repute for the period specified;
  - (d) of being in habits and character a fit and proper person for the Degree of Master of Surgery.
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## CHAPTER XLIX

### MASTER OF OBSTETRICS

1. An examination for the Degree of Master of Obstetrics shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine may be admitted to this examination provided he shall produce certificates to the following effect—

- (a) of having, subsequent to passing the M.B. Examination, attended during a period of six months a course of clinical instruction in a recognised hospital or ward specially devoted to the treatment of Obstetric and Gynæcological cases;
- (b) of having, subsequent to passing the M.B. Examination, had personal charge at least twenty cases of labour, a record of which must be submitted;
- (c) of having, subsequently to passing the M.B. Examination, completed—

either three years' continuous practice of the medical profession,

or two years of hospital practice.

If the candidate be a Graduate in Medicine with Honours in Midwifery, each of these periods shall be reduced by one year.

No application shall, however, be entertained unless two Members of the Faculty of Medicine or two Masters of Obstetrics shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Medicine the candidate has practised his profession with repute for the period specified and that in habits and character he is a fit and proper person for the Degree of Master.

3. Every candidate for admission to the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 200 at least two months before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of two hundred rupees on each occasion.

5. Every candidate shall be examined in the following subjects:—

- (1) Obstetrics (two papers, one of which may be a case for commentary).
- (2) Anatomy, Physiology, Embryology and Pathology in relation to Obstetrics and Gynæcology (one paper).
- (3) Gynæcology (one paper).
- (4) Operative Gynæcology and the use of instruments.

The examination shall be written, oral and practical.

6. A candidate for the Degree of Master of Obstetrics shall transmit to the Registrar, not less than two months before the commencement of the examination, a thesis or published work embodying the result of independent research and having definite relation to Obstetrics or Gynæcology. The candidate must indicate in what respects his thesis or research appears to him to advance Obstetric or Gynæcological knowledge or practice. The candidate may also submit any printed contribution or contributions tending to the advancement of Medical Science published independently or conjointly.

If the thesis or published work be approved by the Examiners they will report on the same as “commended” or “highly commended.” Unless the thesis is commended, the candidate shall not be admitted to the examination.

7. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order, with the titles of their theses and the opinions of the examiners thereon placed against the name of each candidate. If, in the opinion of the examiners, sufficient merit be evinced, a University gold medal shall be awarded to the candidate who shall pass with the greatest distinction.

8. Any candidate who is not a Bachelor of Medicine may be admitted to the Examination for the Degree of Master of Obstetrics in accordance with the conditions laid down in Regulations 5 and 6, on producing certificates to the following effect:—

- (a) of having passed the Licentiate Examination in Medicine and Surgery of the University;
- (b) of having passed the Examination in Zoology required for the Preliminary Scientific M.B. Examination;
- (c) of having practised the medical profession with repute for the period specified;

- (d) of having, subsequent to passing the Licentiate Examination in Medicine and Surgery, attended during a period of six months a course of clinical instruction in a recognised hospital or ward specially devoted to the treatment of Obstetric and Gynæcological cases;
  - (e) of having, subsequent to passing the Licentiate Examination in Medicine and Surgery, had personal charge of at least twenty cases of labour, a record of which must be submitted;
  - (f) of being in habits and character a fit and proper person for the Degree of Master of Obstetrics.
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## CHAPTER XLIX-A

### DIPLOMA IN OPHTHALMIC MEDICINE AND SURGERY

1. An examination for a Diploma in Ophthalmic Medicine and Surgery shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts, Part I and Part II, as defined below in Section 5.

2. Any Bachelor of Medicine or Licentiate in Medicine and Surgery may be admitted to this examination on production of certificates of having, subsequent to passing the M.B. or L.M.S. Examination,—

(i) received instructions in the following subjects at an institution recognised for the purpose by the University from teachers approved by the University:—

- (a) Anatomy and Embryology of the Visual apparatus including the contents of the Orbit, the bones in the neighbourhood thereof, and the central nervous system so far as it is related to vision.
- (b) Physiology of Vision.
- (c) Elementary Optics.
- (d) Optical defects of the Eye.
- (e) Ophthalmic Medicine and Surgery.
- (f) Pathology with special reference to Medicine and Surgical Ophthalmology.

(ii) attended the clinical and practical work in a recognised Ophthalmic Hospital or the Ophthalmic Department of a General Hospital having at least 20 Ophthalmic beds, for at least eighteen months of which six months should be devoted to Refraction work. During this period he must be engaged in the study of Ophthalmology in relation to General Medicine and Surgery. The conditions of the certificate will be fulfilled by holding the appointment as House Surgeon, House Physician, Clinical Assistant, Tutor or a Post-Graduate student or scholar in a recognised Ophthalmic Hospital.

(iii) attended a practical course of operations in Ophthalmic Surgery.

(iv) attended a practical course of Pathology and Bacteriology with special reference to Ophthalmology.

(v) has been engaged in the Post-Graduate study of Ophthalmology for not less than two years at a recognised institution.

Provided that a candidate may appear in Part I (but not in Part II) of the examination on the completion of a year of practice; provided also that a candidate may not appear in Part II until he has passed in Part I of the examination.

3. Every candidate for admission to each part of the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion.

5. Every candidate shall be examined in the following subjects:—

#### PART I

- (a) Anatomy of the Eye ... .. *One Paper.*  
 (b) Physiology and Elementary Optics ... .. ,

#### PART II

- (a) Ophthalmic Medicine and Surgery  
     including Optical defects ... .. *One Paper*  
 (b) Relations of Ophthalmology to General  
     Medicine and Surgery ... .. ,  
 (c) Pathology and Bacteriology with refer-  
     ence to Ophthalmology ... .. ,

The examination shall be written, oral, clinical and practical.

6. The full marks for each subject and minimum marks required for passing shall be as follows:—

#### PART I

	Written	Oral and practical	Total	Passing marks
(a) Anatomy of the Eye	100	100	200	100
(b) Physiology and Elementary Optics.	100	100	200	100

## PART II

	Written	Oral	Clinical and Practical	Total	Passing marks	Passing marks. Written and Oral	Passing marks, Clinical and Practical
(a) Ophthalmic Medicine and Surgery including Optical defects.	100		200	400	200	100	100
(b) Relation of Ophthalmology to General Medicine and Surgery.	100	100	100	300	150	100	50
(c) Pathology and Bacteriology with reference to Ophthalmology.	100	100	100	300	150	100	50



## CHAPTER L

### DIPLOMA IN PUBLIC HEALTH

1. An examination for a Diploma in Public Health shall be held twice every year in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

The examination shall be divided into two parts, Part I and Part II, as defined below in Section 5.

2. Any Bachelor of Medicine or Licentiate in Medicine and Surgery may be admitted to this examination on production of certificates of having, subsequent to passing the M.B. or L.M.S. Examination,—

(i) attended during a period of not less than three and a half months approved courses of instruction in (a) Bacteriology including Immunology and Serology, Filterable Viruses and the Rickettsias, Medical Entomology, Protozoology and Helminthology especially in their relation to diseases of man and to those diseases of the lower animals transmissible to man—this course to last at least 200 hours; (b) Public Health Chemistry and Physiology (Bio-chemistry and Bio-physics) applied to Public Health—this course to last at least 160 hours;

(ii) been diligently engaged for at least six months in acquiring a practical knowledge of the duties, routine and special, of public health administration under the supervision of a recognised medical officer of health of a town or sanitary area of not less than fifty thousand inhabitants, who shall certify that the candidate has received from this officer or from other competent Medical officer, during not less than three hours on each of 60 working days, instruction in these duties [ a candidate who produces evidence that he has been in independent sanitary charge of a town or district (or, in the case of Calcutta, a part of a district) for a period of at least six months may under very special circumstances be exempted from this rule];

(iii) attended for three months in the clinical practice of a recognised hospital for infectious diseases and received therein instruction in the methods of administration (at least 30 attendances of not less than two hours each shall be required);

(iv) received, during not less than 80 hours at an institution or from teachers approved by the University, instructions in the following subjects :—

The principles of Public Health and Sanitation ...	30	hours
Epidemiology and Vital Statistics ...	20	"
Sanitary Law and Administration ...	20	"
Sanitary Construction and Planning ...	10	"

(the numbers indicate the approximate proportion of hours to be devoted to each subject);

(v) practised the medical profession for a continuous period of one year and a half which may include the period of training specified above.

Provided that a candidate may appear in Part I (but not Part II) of the examination on the completion of a year of practice. Provided also that a candidate may not appear in Part II until he has passed in Part I of the examination.

3. Every candidate for admission to each part of the examination shall send his application to the Registrar with a certificate in the form prescribed by the Syndicate and a fee of Rs. 100 at least one month before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a fee of Rs. 50 on each occasion.

5. Every candidate shall be examined in the following subjects :—

#### PART I

- (a) Microbiology including Bacteriology, Immunology and Serology, Filterable Viruses and the Rickettsias, Medical Entomology, Protozoology and Helminthology—(One Paper).
- (b) Public Health Chemistry and Physiology (Bio-Chemistry and Bio-Physics) applied to Public Health—(One Paper).

#### PART II

- (c) Hygiene and Sanitation including Sanitary Engineering—(One Paper).
- (d) Epidemiology and Infectious Diseases—(One Paper).
- (e) Sanitary Law, Vital Statistics and Public Health Administration—(One Paper).

The examination shall be written, oral and practical, and shall include Food Inspection and Sanitary Inspection of factories, schools, premises or areas.

6. The limits of subjects referred to in paragraphs 5 shall be as follows :—

(a) MICROBIOLOGY

(i) *Bacteriology* :

The classification of bacteria, their morphology and physiology including their cultivation, fermentation, reaction and pathogenicity.

The Pathogenic Cocci and Bacteria—*Streptococcus*, *Meningococcus*, *Gonococcus*, Typhoid, *Salmonella*, Dysentery, *Diphtheria*, *Mallei*, Tubercle, Leprosy, Plague, *Melitensis*, *Abortus*, Anthrax, Tetanus, *Botulinus* and the *Cholera vibrio*, including the mode of transmission and method of isolation.

The preparation, standardisation, storage and uses of prophylactic vaccines.

The destruction of bacteria and disinfection.

The bacteriology of water, milk and milk products and other foodstuffs including the methods of collection and examination of samples and interpretation of the results obtained.

The bacteriology of air, dust, soil and sewage.

(ii) *Immunology and Serology* :

Different forms of immunity in the individual. Mechanism of immunity in different infections. Immunity in the herd.

The serological tests in common use in diagnosis. Agglutination, Precipitation, Flocculation, Jellification, Complement fixation and Allergic Tests.

Immunisation, including the preparation, standardisation, storage and use of anti-sera used in prophylaxis and treatment.

(iii) *Filterable Viruses and the Rickettsias*.

The general characteristics of viruses and the methods of studying them—filtration, tissue culture, cell inclusions.

The pathogenic viruses—variola, vaccinia, measles, chickenpox, poliomyelitis, influenza, encephalitis, lethargica, yellow fever, dengue, papataci fever, rabies, trachoma, including the mode of transmission of diseases caused by them.

Methods of preparation, storage and uses of prophylactic vaccines against smallpox, rabies, yellow fever.

The bacteriophage and its uses in public health.

The Rickettsias and their mode of transmission.

(iv) *Medical Entomology* :

The classification of the Animal Kingdom and the general characters of insects, including their collection, identification and preservation.

Insects concerned in the transmission of disease—mosquito, sandfly, housefly, flea, louse, tick, mite. Their life-cycle and habits, the way in which they act as carriers and the methods of control.

(v) *Protozoology*:

The classification of protozoa, their morphology and methods used in studying them.

The pathogenic protozoa—*E. histolytica*, *G. lamblia*, *B. coli*, *L. donovani*, *L. tropica*, *P. vivax*, *P. malariae*, *P. falciparum*, Trypanosomes, Coccidia and Sarcosporidiae, including the mode of transmission and methods for collecting and examining infective material.

The pathogenic spirochaetes—*T. pallidum*, *T. pertenue*, *Sp. recurrentis*, *Lept. icterohaemorrhagiae*, and the spirochaetes of Vincent's angina and Nagu sore. Their mode of transmission and methods for collecting and examining infective material.

(vi) *Helminthology*:

The classification of the helminth parasites, their morphology and methods used in studying them.

Helminths of public health importance.—Nematodes—Hookworms, *Wuchereria bancrofti*, *Filaria malayi* and *Dracunculus medinensis*. Cestodes—*Tenia solium* and *saginata*, *Echinococcus*; and Trematodes. Their morphology, biology, recognition and life-history. Mode of transmission and methods of destruction of helminths in various materials.

(b) PUBLIC HEALTH CHEMISTRY AND PHYSIOLOGY (BIO-CHEMISTRY AND BIO-PHYSICS) APPLIED TO PUBLIC HEALTH

(i) *Public Health Chemistry*:

General principles and methods of quantitative analysis, volumetric, gravimetric and gasometric. The theory and determination of Hydrogen-ion concentration. Methods of collection of water, sewage, sewage effluents and other effluents, milk, common articles of foods and disinfectants, such as cyano gas, pyrethrum, retinone, paris green, mineral oils, etc., for chemical analysis. Principles of qualitative and quantitative analyses of the above substances. Interpretation of reports of analysis.

(ii) *Physiology (Bio-Chemistry and Bio-Physics) applied to Public Health*:

General: Adjustment of individuals and communities to environment—internal and external—influencing the state of

health. The span of life, its prolongation and rejuvenescence. Influence of geographical position and altitude on health including climatological considerations. Physiological effects of radiations, *e.g.*, infra-red, ultra-violet, X-ray, etc. Illumination and hygiene of the eyes. Physiology of ventilation, air cooling and air conditioning. Clothing in the tropics. Urban and rural environments. Socio-economic factors. Occupational environment, agricultural, industry, smoke, dust and gas pollution of air. Effects of noise and vibration. Assessment of physical fitness.

Practical work : Methods of determining temperature, humidity and atmospheric pressure. Methods of measuring comfort conditions. Detection and estimation of atmospheric pollution due to smoke, dust and poisonous gases. Photometric measurement of natural and artificial light in schools and factories. Determining efficiency of clothing. Estimation of work and total metabolism : determination of onset of fatigue and inefficiency. Treatment of asphyxia, electric shock and gas poisoning.

(iii) *Nutrition :*

The place of nutrition in public health, its special significance under Indian conditions. Basal and total metabolism. Energy requirements and caloric values of foods. Carbohydrates and fats and their rôle in nutrition. Protein requirement of man and its determination. Inorganic elements, calcium, phosphorus, iodine, iron, copper and other trace elements and their importance in nutrition. Vitamins, their nature, function, optimum requirements, clinical and pathological results of vitamin deficiencies. Balanced diets in relation to age, sex, occupation and physiological states. Methods of cooking and their effect on the nutritive values of foods. Assessment of state of nutrition of individuals and of communities. Methods of conducting dietary surveys and making suggestions for improvement. Methods of conducting field experiments in nutrition. Socio-economic factors in nutrition. Relation of agriculture, animal husbandry and food industries to nutrition. Nutrition propaganda.

Practical work : The use of food analytical tables in planning of balanced diets for various groups. Detection of vitamin and other deficiencies by anthropometric, clinical and physiological methods. Nutrition and dietary surveys and constructive criticism of food habits and food production.

(c) PRINCIPLES OF PUBLIC HEALTH AND SANITATION

The principles and practice of personal, communal, international and occupational hygiene. The effect of climate, environment and food on the human organism and communities,

water and water-supplies; water purification and disinfection, waterborne diseases. The study of the atmosphere in its relation to health and disease; ventilation of towns, houses and buildings; the causes and effects of vitiation of the atmosphere; the planning of towns, villages, houses and huts, factories and barracks.

The effect of soils on health; building sites. The collection and disposal of refuse and excretal matter. Foodstuffs, their composition, purity, examination, sophistication, etc.

The study of diets specially in regard to tropical countries with special reference to such diseases as beriberi, epidemic dropsy, rickets, scurvy, etc.

The effects of famine conditions and economic stress on the human organism. Clothing in relation especially to climate.

Epidemic, endemic and infectious diseases of both temperate and tropical climates. Their epidemiology, geographical and seasonable distribution, origin, causation, mode of spread, etc., and prevention, special attention being paid to the study of such diseases as occur in India.

The control and prevention of infectious diseases by isolation, disinfection, vaccination, etc., with special reference to small-pox, cholera, plague and other tropical diseases. The construction and administration of hospitals for infectious diseases. Industrial hygiene, the special diseases of occupations, causation, their detection and prevention. Maternity and child welfare work.

School hygiene and medical examination of school children. Anti-tuberculosis schemes and their applicability. Venereal diseases; their cause: their control and treatment by the State. The control of food-supplies, markets, dairies, milkshops, slaughter houses.

Meat inspection, food inspection, methods of examination of sound and unsound food.

Building construction; the making of plans, their interpretation and criticism.

#### (d) SANITARY LAW

The history of sanitary law and administration in England, India and other countries. The present system of sanitary administration in India. Forms of Local Government and their relation to public health and sanitation. The sanitary laws and enactments of Great Britain and India. The duties of health officers, sanitary inspectors, factory inspectors, certifying surgeons—Port-Health laws and duties of Port-Health officers.

#### (e) VITAL STATISTICS

The collection, modes of calculation and the interpretation of vital statistics. The census; calculation of population, birth

rates, death rates, marriage rates, infantile mortality rates, etc. Elementary statistical methods and their application and interpretation. Life tables. The preparation of sanitary reports. The study of the Annual Reports of Public Health Commissioner and Directors of Public Health in India; methods of epidemiological investigation.

7. The full marks for each subject and the minimum marks required for passing shall be as follows:—

	Written		Oral and Practi- cal		Total Passing marks
	Total marks	Passing marks	Total marks	Passing marks	
<i>Part I</i>					
Bacteriology and Parasitology ...	50	25	50	25	50
Public Health Chemistry and Bio-Physics and Bio-Chemistry	50	25	50	25	50
<i>Part II</i>					
Hygiene and Sanitation ...	50	25	50	25	50
Epidemiology and Infectious Diseases ...	50	25	50	25	50
Sanitary Law, Vital Statistics, etc. ...	50	25	50	25	50

8. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order. If, in the opinion of the Examiners, sufficient merit be evinced, a University gold medal will be awarded to the candidate who shall have passed with the greatest distinction.

## CHAPTER L-A

### DOCTOR OF SCIENCE (PUBLIC HEALTH)

1. An examination for the Degree of Doctor of Science (Public Health) shall be held annually in Calcutta and shall commence at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine or Licentiate in Medicine and Surgery may be admitted to this examination on the production of certificates of having—

(a) subsequently to passing the M.B. or L.M.S. Examination, obtained a Diploma in Public Health or passed an examination equivalent thereto, and

(b) subsequently to obtaining the qualifications as mentioned in (a), undergone (i) at least two years' regular training in a recognised institution in some special subject on Public Health previously approved by the Faculty of Medicine, or (ii) at least three years' work in any other approved Laboratory in some special subject on Public Health previously approved by the same Faculty.

3. Every candidate shall state in his application the special branch or subject in Public Health, upon a knowledge of which he rests his qualification for the Doctorate.

4. Every candidate for admission to the examination shall send his application to the Registrar with the necessary certificates and a fee of Rs. 200 at least one month before the date fixed for the commencement of the examination.

No application shall, however, be entertained unless the Head of the Institution in which the applicant has worked as required under clause (b) of Section 2, or a Doctor of Science (Public Health) shall have testified, to the satisfaction of the Syndicate, that in habits and character the candidate is a fit and proper person for the Degree.

5. A candidate who fails to pass or present himself for examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of two hundred rupees on each occasion.

6. A candidate for the Degree of Doctor of Science (Public Health) shall transmit to the Registrar, along with his application, a thesis or published work embodying the result of



research carried out independently or under approved direction and having definite relation to Public Health. The candidate must indicate in what respects his thesis or published work appears to him to advance the knowledge in the science of Public Health.

7. The thesis shall be referred by the Syndicate to a Board of not less than two Examiners.

If the thesis or published work is approved by the Board of Examiners, they will report on the same as "commended" or "highly commended." Unless the thesis is commended, the candidate shall not be admitted to the examination.

8. Every candidate shall be examined in the following subjects:—

General Public Health Subject—(*One Paper*).

Special Public Health Subject offered by the candidate under para. 3 (*One paper*).

Thesis.

In addition to the written examination, the candidate may be required to undergo an oral and practical examination at the discretion of the examiners.

The examination shall be conducted by the same Board of Examiners appointed to examine the thesis, unless the Syndicate otherwise directs.

9. As soon as possible after the examination, the Syndicate shall publish a list of successful candidates arranged in alphabetical order with the titles of their theses placed against the name of each candidate. If, in the opinion of the examiners, sufficient merit be evinced, a University Gold Medal shall be awarded to the candidate passing with the greatest distinction.

## CHAPTER L-I

### INTERMEDIATE EXAMINATION IN ENGINEERING

1. The Intermediate Examination in Engineering will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in a College of Engineering affiliated to the University for two academical years after passing the Intermediate Examination in Arts or in Science, or for one academical year after passing the B.Sc. Examination in Mathematics, Physics and Chemistry or Geology, or in Mathematics, Chemistry and Physics or Geology, in which case he shall be excused from appearing in those subjects at Section A of the Intermediate Examination in Engineering in which he appeared at his B.Sc. Examination but he shall not be declared to have passed in Section B until he has qualified himself in the remaining subject of Section A.

3. The Intermediate Examination shall be divided into two Sections, A and B, the limits of which are set down in the Syllabus.

Section A may be taken at the end of the first year of the Intermediate course, and in the event of a candidate failing in one group, Mathematics or Physics or Chemistry, he may be allowed to present himself for re-examination in that group when appearing at the Intermediate Examination in Engineering, provided that a candidate securing Pass marks in each group but failing in the aggregate may be allowed to present himself for re-examination in one or more groups, when appearing at the examination. Such a candidate may obtain credit for the remaining group or groups, as the case may be, of Section A, but he shall not be allowed to pass in, Section B unless he has previously passed in Section A.

4. Every candidate for admission to the examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 25 for Section A or Rs. 40 for the Intermediate Examination in Engineering (whether he has previously passed in Section A or not), fourteen days before the date fixed for the commencement of the examination.

A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee.

A candidate may be admitted to one or more subsequent examinations on payment of a like fee of the amount herein prescribed on each occasion.

5. Every candidate shall be examined in the following subjects:—

Section A—Mathematics and Science.

Section B—Mathematics and Applied Science; Descriptive Engineering; Surveying; Drawing; Estimating.

6. The limits of the subjects shall be as follows:—

## MATHEMATICS

### SECTION A

#### (Theory)

#### A. *Elements of Plane Analytical Geometry*

Rectangular Cartesian Co-ordinates and Polar Co-ordinates—Distance between two points—Areas of polygons—Geometry of straight lines—Standard equations of circle, parabola, ellipse and hyperbola—Equations of tangent and normal.

#### B. *Introduction to Calculus with application*

Function—continuity—simple limits—nature of differentiation—Rules of Differentiation—Differentiation of algebraic, trigonometric and exponential functions—Logarithmic differentiation—Inverse functions and their derivatives—Tangent and Normal—Second differential co-efficient—Maxima and Minima—Curvature (Cartesian form only)

Integration treated as inverse process of differentiation—Simple indefinite integrals.

Applications to simple problems in Physics, Chemistry and Engineering.

#### C. *Graphical Methods*

Graphs of elementary functions, *e.g.*, Second Degree equation.  $x^n$ ,  $e^{kx}$ , A log  $x$  sin  $(px+q)$ , A  $e^{-kx}$  sin  $(px+q)$ ,  $\sin^{-1}x$ ,  $\tan^{-1}x$ , etc.—Determination of Law connecting two variables from tabulated values of the variables—Graphical solution of equation—Graphic Differentiation—Graphic integration.

(Application)

A. *Elementary Mechanics (Technical Applications)*

Centre of Mass—General conditions of equilibrium—Friction—Machines with Friction.

Problems on Relative velocity—Projectile—Laws of Motion with simple applications—Impulse of a Force—Impact—Work—Principle of Energy and Application.

B. *Computation and Mensuration*

Approximate and abbreviated methods of performing numerical calculation.

Use of Binomial and Exponential Theorems.

Use of logarithmic table—Application of logarithm to numerical calculation.

Theory and use of Slide Rule.

Problems on Heights and Distances—Solution of triangles.

Mensuration of plane and solid figures—Application of Simpson's Rule—Prismoidal formulæ, and Guldin's theorem—Calculation of earth work.

SECTION B

(Theory)

Higher Derivatives—Leibnitz's Theorem—Rolle's Theorem and theorems of Mean Value—Taylor's theorem—Application of theory of maxima and minima—numerical evaluation of transcendental functions—Newton's Method of Root Extraction—Curve Tracing.

Integration defined as a limit of a sum—Various theorems leading to indefinite integrals—Theorems for evaluation of definite integrals—Mean Value theorem—Various Methods of integration.

Application to determination of areas, volumes, centroid and moment of inertia.

Formation of differential equation—Order and degree—First order equations with separable variables—Linear equations of the first order—Linear equations of the second order with constant co-efficients (complementary function only)—Technical applications.

Finite Differences with equal interval—Application to interpolation—Numerical Differentiation and Integration (without error estimation).

*(Application)**A. Dynamics (with the help of Calculus)*

Motion in a straight line—Simple Harmonic Motion and technical applications—Linear Momentum and Impact—Rotation about fixed axis—angular momentum—torque—energy due to rotation—centrifugal force—cant on a railway curve—Work, power, energy—conservation of energy—Principle of governors—Belts—Brakes and Dynamometers.

*B. Plane Statics*

Statics of Plane Frame work—Principle of virtual work applied to Frame work—Bending Moment and Shear Forces for statically determinate member—Catenary—Principle of suspension bridge, and suspended cables.

*C. Hydrostatics*

Elementary properties of Fluids—Fluid pressure—Thrust on a plane area—Centre of Pressure—Resultant Thrust—Application to lock gates, quay walls—Conditions of equilibrium—Stability of Floating body—Application to ships and balloons.

## CHEMISTRY

## SECTION A

## GENERAL AND INORGANIC CHEMISTRY

*Theoretical*

Nature of physical and chemical changes; laws of chemical combination; atomic theory; determination of atomic weight and molecular weight; Avogadro's hypothesis and its application; law of Dulong and Petit; law of isomorphism; chemical notation and nomenclature; valency; the gas laws; the kinetic theory of gases; diffusion; distillation; evaporation; laws of solution; osmotic pressure; thermo-chemistry; influence of mass on chemical change; gaseous dissociation; elements of electro-chemistry; hypothesis of ions and ionic dissociation; periodic classification of the elements; radio-activity and atomic structure.

Systematic study of the following elements and their chief compounds with special reference to their technical applications:—

Hydrogen, oxygen, nitrogen, helium, argon, fluorine, chlorine, bromine, iodine, sulphur, boron, carbon, silicon, phos-

phorus, arsenic, sodium, potassium, calcium, strontium, barium, magnesium, zinc, cadmium, mercury, copper, silver, gold, aluminium, manganese, iron, nickel, cobalt, chromium, tin, lead, antimony, bismuth.

### *Practical*

Qualitative analysis by dry and wet tests of inorganic mixtures not containing more than three radicals from the following:—

Silver, lead, mercury, copper, bismuth, cadmium, tin, arsenic, antimony, iron, manganese, aluminium, chromium, zinc, cobalt, nickel, calcium, strontium, barium, magnesium, potassium, sodium, ammonium, chloride, bromide, iodide, sulphide, sulphite, sulphate, chromate, phosphate, nitrate, nitrite, borate, silicate, carbonate, arsenate and arsenite.

Easy quantitative determinations including volumetric and gravimetric methods of chemical analysis.

## PHYSICS

### SECTION A

#### GENERAL PHYSICS

##### *Theoretical*

##### *(a) Heat*

Expansion of solids, liquids and gases. Pressure co-efficient of a gas. Compressibility of gases. Principles of thermometry. Thermometers for various purposes. Absolute temperature. Barometer correction. Calorimetry; correction for radiation. Specific heats of solids and liquids. Specific heats of gases at constant pressure and constant volume. Dulong and Petit's Law. Change of state and aggregation. Critical temperature; continuity of state. Measurement of heat of fusion and vaporisation. Influence of pressure on melting and boiling points. Methods of liquefying gases. Pressure of saturated vapour. Freezing and boiling points of solutions. Vapour density. Hygrometry.

##### *(b) Light*

Reflections, plane and spherical mirrors. Refraction; prisms; determination of refractive indices of solids and liquids. Thin lenses. Dispersion; spectroscopes; spectra; colour. Chromatic aberration. Spherical aberration. Telescopes; mi-

crossscopes; sextant; epidiascope. Velocity of light; Foucault's and Fizeau's experiments. Elementary wave theory—reflection, refraction and interference.

### (c) *Current Electricity*

Chemical and thermal methods of producing current. Electrolytic condition. Faraday's laws. Coulometers, Electrolysis of fused compounds and of saline solutions. Ohm's law, Kirchhoff's laws. Wheatstone's bridge. Resistance of battery. Resistance of galvanometer.

Electromotive force. Standard cells. Potentiometer. Joule's Law.

Electro-magnetic Induction, Lenz's Law, Rhumkorff's coil. Self and Mutual Inductance, growth and decay of induced currents.

### (d) *Magnetism*

Magnetic fields. Magnetic curves. Declination theodolite; dip circle. Relation of magnetism to electricity. Galvanometers.

Methods of magnetisation. Electromagnets.

Permeability and methods of measuring it. Magnetic hysteresis. Magnetic flux, magnetomotive force, reluctance. Law of traction.

### *Practical*

Measurement of thickness by wire gauge, micrometer screw-gauge, micrometer callipers, spherometer. Determination of radius of curvature by spherometer. Cathetometer; adjustment; verification of Boyle's Law. Co-efficients of tensile elasticity. Dividing machines and their uses. The balance; adjustments, weighing by the method of oscillation; specific gravity of solids and liquids. The barometer; reading and correction.

Expansion of solids and liquids. Pressure and volume co-efficients of air. Hygrometry; dew point hygrometers; wet and dry bulb hygrometer; comparison of results. Calorimetry; correction for loss of heat; specific heats of solids and liquids; heat of fusion and evaporation. Melting and boiling points; distillation. Pressure of aqueous vapour.

Magnifying power of telescope; focal lengths of mirrors and lenses. Total reflection. Measurement of indices of refraction. Spectrometer; adjustments; measurement of refractive index.

Setting up and reading of galvanometers. Ohm's law. Meter bridge. Potentiometer; voltage measurement. Copper volt-meter.

## APPLIED PHYSICS

### SECTION B

#### *Theoretical*

Conduction of heat; measurement of conductivity of poor, medium and good conductors. Application of theory of steady flow to practical problems.

Elementary Kinetic Theory of Gases.

The two laws of thermodynamics; Carnot's cycle; dissipation of energy; entropy, temperature—entropy diagram; thermodynamics of a fluid; change of state; the porous plug experiment; Osmotic pressure; vapour pressure; radiation.

Total normal electric induction; Gauss's theorem and its applications. Electric work: potential; lines and tubes of force; equipotential; energy in the electric field. Condensers; specific inductive capacity. Electrometers; electrostatic volt-meter. Statical comparison of capacities.

Theory of magnetic shells. Ammeters and voltmeters. Electro-dynamometers; Kelvin's balance. Thermo-galvanometer. Thermo-electricity. Radio-micrometer. Ballistic galvanometer. Absolute and practical units; dimensions; measurements.

#### *Practical*

Temperature co-efficient of resistance; resistance of glow lamps; low and high resistances P. O. box—specific resistance; galvanometer resistance; battery resistance. Electrolytic resistance. Calibration of galvanometer and meter bridge. Calibration of ammeter by silver voltmeter and potentiometer. Joule's calorimeter. Kelvin's balance. Ballistic galvanometer; constant; comparison of capacities and inductances. Earth Inductor. Deflection, oscillation and reflection magnetometers. Comparison of magnetic moments. Measurement of permeability, earth's horizontal component and dip.

## DESCRIPTIVE ENGINEERING

### MATERIALS OF CONSTRUCTION

#### *Stones*

General classification, characteristics and uses as Building and Road materials.



General structure—Fineness of grains, compactness, porosity, absorption, weight, appearance, natural bed, tests, durability, hardness, facility of working, strength, preservation.

Places where important varieties are found.

Quarrying and blasting—Descriptions of Methods. Line of least resistance, amount of charge, machines and tools used.

### *Artificial stones*

Methods of manufacture, materials used. Characteristics and uses.

### *Bricks*

Composition of brick earth. Classifications of earths. Test of clay used.

Brick manufacture—Preparation of earth, tempering. Pug mill.

Sizes of bricks in India, Great Britain, U.S.A. Brick moulds and methods of moulding—Hand, table; terms and tools used in moulding. Machine moulding. Method of drying and burning; Clamp Kiln, Bull's Kiln. Details and method of operation.

Classification of bricks. Characteristics and tests. Fire clay and other refractory bricks.

### *Tiles*

Preparation of clay, moulding, types, manufacture, drying, burning and glazing. Sketches of different types.

Encaustic tiles, terracotta, earthenware, stoneware.

### *Sand*

Types. Qualities, impurities. Effect of clay in sand. Washing, voids, specification, grading, weights.

### *Soorkee*

Method of manufacture. Uses. Specification.

### *Broken stone and broken brick*

Sizes used in building and road-work, and concrete. Grading. Aggregate, wasting, voids, weights. Specification. Comparisons. Tests.

*Lime*

Varieties, classification. Tests. Slaking. Impurities. Estimation of clay, sand, oxide of iron, alumina, etc., in limestone. Manufacture. Continuous and intermittent Kilns. Plaster of Paris and Stucco.

*Mortar*

Common and hydraulic. Definition and uses. Object of mixing sand in mortar. Proportions and ingredients. Methods of mixing. Portable mortar mill. Precautions in using mortar. Use of sugar, molasses. Strengths.

*Lime concrete*

Size and proportions of ingredients. Mixing dry and wet. Advantages. Method of laying.

*Lime plaster*

Lime pointing, whitewash, colour wash, distemper:—  
Composition, external and internal use. Method of application, single coat, double coat, sand plaster, lime punning, sand rubbing, soorkee plaster.

*Cement*

Types. Composition. Manufacture. Uses. Ingredients and proportions. Impurities. Tests. Specimens. Specification. Cement plaster: Definition, uses, method of using. Ingredients and proportions.

*Cement concrete*

Definition, proportions, ingredients, mixing. Uses in sea water.

*Preservatives and protectives*

Coal tar, Wood tar, pitch, Crosote, bituminous products, Felt, vulcanised rubber, Asbestos.

*Timber*

Common types. Selection of timber. Defects. Dry-rot, wet-rot. Staking and Seasoning. Sawing. Location of different types. Uses in Structural work. Strengths. Tests.

*Metals*

Iron and Steel: Constituents; Iron, Steel, Brass, Lead, Copper. Use of Alloy steels. Rust and its prevention in structures.

*Paint*

Base-carrier, drier, colouring pigment, solvent. Preparation and proportioning of ingredients. Mixing; painting. Priming and other coats. Painting of woodwork, iron and steel-work. Repainting old wood, iron and steel work.

Varnishing, oiling, coal tarring, etc.

## DETAILS OF CONSTRUCTION

*Foundation of Buildings*

Bearing power of soil, open, grillage, raft, pile, foundations. Types of piles. Simple designs of masonry foundations. Setting out buildings, excavation of trenches.

*Brick-work*

Frog, headers, stretchers, closers, corbelling, bonding, backing, ponding. English, Flemish, Herring-bone bond, for different thicknesses of walls and different size square pillars.

*Floors*

Different types of flooring as cement plastered, 1" patent stone, mosaic, asphalte, brick-on-edge flat-titled, marble, etc.

*Roofs*

Flat tee and tile, Jack-arched, Reinforced brick, Reinforced concrete, *Halka-khilan* tile. Methods of repairing and water-proofing roofs; half terracing, roof and floor loads. Sloped roofs, types of trusses with parts named. Lean-to-roofs. Design of scantling from values of  $bd^2$  and  $bd^3$ .

*Doors and windows*

Widths and heights, sizes of frames, different methods of fixing, Types such as Ledged; Ledged and braced; Framed and ledged, Framed, ledged and braced; Battened; Panel; Venetian; Sash.

*Lintels and Sunshades**Staircases*

Different types, Dog-legged, circular, spiral and well. Relation between risers and treads. French theory. Head-room width, Landings, types and descriptions, Names and descriptions of all parts.

*Carpentry and wooden joints.*

*Details of light steel work and their joints.*

*Types of Arches and their centerings.*

*Shoring and timbering of trenches.*

*Well Foundations, Caissons, Sinking of wells.*

*Bearings on walls of buildings.*

## ELECTRICAL ENGINEERING

*Theoretical*

Mechanical, thermal and electrical units. Simple laws of electrical circuits. Electro-magnetic forces and induction of E.M.F.; magnetic properties of iron and steel. D.C. motors and generators—E.M.F. equations for different types of windings; shunt, series and compound wound machines. Broad principles involving commutation and armature reaction. Simple characteristics of D.C. machines. Secondary cells. Simple problems on D.C. distribution. I.E.E. Tables for wires and cables. Alternating currents—Production of A.C. E.M.F.; wave diagrams for A.C. E.M.F., current and power, R.M.S., value, average value and form factor. Phase displacements and vectorial representation of alternating quantities. Effect of resistance, inductance and capacitance. Simple series and parallel circuits. Power and power-factor of simple A. C. circuits.

*Practical*

Measurement of low and high resistances; calibration of ammeters and voltmeters; variation of lamp resistances with current; different uses of milli-voltmeters and milli-ammeters; fault localisation of electrical machines; uses of megger; practical house wiring diagrams; resistance measurement by 'drop method.' No-load characteristics of shunt, series and compound wound generators and motors. No-load characteristics of separately excited motors and generators.

## MECHANICAL ENGINEERING

Characteristics of materials and behaviour under stress. Testing of materials. Simple stresses: live load stresses; Stress in machine parts due to simple bending: torsion of shafts. Simple helical springs: Simple mechanisms such as the four bar mechanism and the simple slider crank chain mechanisms.

Work lost in friction: belt and rope pulleys: wheel trains: epicyclic trains. Toothed gearing: circular and diametrical pitch. Methods of cutting wheel teeth. Screws and screw cutting. ....

Simple cams: Steam boiler efficiencies. Boiler tests. Care and management of boilers: Steam Engine valve diagrams. Governors: Flywheel: work done in steam engine cylinder: Diagram factor: Theoretical mean effective pressure.

The Gas Engine: general description: producers and producer gas. Ignition: governing: the Petrol engine: types: ignition and other troubles in petrol engines: carburettors.

Oil Engines of the Diesel and Semi-Diesel types. Methods of starting. Atomisers: governing: testing. Humphrey gas pumps.

This course will be accompanied by a course of Practical work in the Prime Mover and Mechanical Laboratories.

## SURVEYING

*Surveying.*—Construction of Scales. Conventional signs. Use and adjustment of instruments. Theory of levelling; simple compound check and reciprocal levelling. Method of keeping various styles of field-books. Use of boning rods. Chain survey. Chain and compass survey.

Theodolite Traversing by Gale's traverse system for city and town improvement surveys. Source of errors and required precision in traversing. Traverse tables. Theory and use of the simple plane-table and tangent clinometer, with and without the magnetic compass. Computation by rectangular co-ordinates with convergency correction. Longitudinal and cross-sections run with a level.

*Railway curves and Alignments.*—Curves laid out by linear measurement only. By chords and offsets (several methods). By offsets inside the curve. Setting out pegs for earthwork. Computation of areas of cross-sections, etc.

## DRAWING

*Civil:—*

### (1) Geometrical Drawing.

Scales, Printing, Proportionals, Triangles, Quadrilaterals, Circles and Tangents, Polygons, Sectors, Inscription and circumscription of figures by circles and other rectilinear figures, Areas, Plane Curves (Parabola, Ellipse, etc.).

### (2) Projections.

(a) Orthographic of points, lines, planes and solids, Sections.

(b) Isometric Projection, Scales, Solids, Objects, etc.

(3) Interpenetration and Development of solids and sections through interpenetrating objects.

(4) Building Drawings from models to scale and actual buildings.

*Mechanical:—*

(5) Drawing of Machine and Engine details from models to scale and from actual machines and engines.

## ESTIMATING

*Civil:—*

The estimating and preparation of indents for materials of simple buildings, culverts, earthwork.

*Mechanical:—*

The weights and costs of machine details.

7. There shall be 4 papers and 2 practical tests in Section A and 9 papers and 5 practical tests in Section B.

The subjects and marks shall be distributed as follows:—

### SECTION A

*(To be taken at the end of the First-year)*

#### *Mathematics*

(1) Plane Analytical Geometry, Calculus and Graphical Methods ( <i>Theory</i> )	...	...	300	
(2) Elementary Mechanics and Computation and Mensuration ( <i>Application</i> )	...	...	300	
			—	600

#### *Chemistry*

(3) General Chemistry ( <i>Theory</i> )	...	...	200	
Ditto ( <i>Practical</i> )		...	200	
			—	400

#### *Physics*

(4) General Physics ( <i>Theory</i> )	...	...	200	
Ditto ( <i>Practical</i> )	...	...	200	
			—	400
				—
Total Section A	...			1,400

## SECTION B

## GROUP I

*Mathematics and Science*

(5) Calculus ( <i>Theory</i> )	...	...	...	300
(6) Dynamics, Plane Statics and Hydrostatics				
( <i>Application</i> )	...	...	...	300
(7) Applied Physics ( <i>Theory</i> )	...	...	...	100
Ditto ( <i>Practical</i> )	...	...	...	100
				<hr/>
				800

## GROUP II

*Mechanical and Electrical Engineering*

(8) Mechanical Engineering ( <i>Theoretical</i> )	...	300
Ditto (Laboratory, Sessional Work)	...	200
(9) Electrical Engineering ( <i>Theoretical</i> )	...	300
Ditto (Laboratory, Sessional Work)	...	200
		<hr/>
		1,000

## GROUP III

*Civil Engineering*

(10) Materials of Construction	...	200
(11) Details of Construction and Estimating	...	400
		<hr/>
		600

## GROUP IV

*Surveying and Drawing*

(12) Surveying ( <i>Theoretical</i> )	...	300
Ditto ( <i>Practical</i> , Sessional Work)	...	200
(13) Drawing ( <i>Theoretical</i> )	...	300
Ditto ( <i>Practical</i> , Sessional Work)	...	200
		<hr/>
		1,000

Total Section B	...	<hr/>	<hr/>	3,400
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8. The order of merit on passing the Intermediate Examination in Engineering shall be determined only by the marks obtained by the candidate in Section B.

9. As soon as possible after the Intermediate Examination in Engineering, the Syndicate shall publish lists in order of merit of those who have passed the Intermediate Examina-

tion in Engineering under the conditions laid down in Rule 8. They shall also publish lists in alphabetical order showing the candidates who have qualified in any two Groups of Section A and declaring the group in which a candidate may again have to present himself.

10. The pass marks for each section of the Intermediate Examination in Engineering shall be one-third in each group of subjects and half of the aggregate.

11. Any candidate, who has failed in one subject only, and by not more than 5 per cent of the full marks in that subject, and has shown merit by gaining 60 per cent or more in the aggregate of the marks of the examination, shall be allowed to pass.

12. If the Examiners are of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate



## CHAPTER LII

### BACHELOR OF ENGINEERING

1. An examination for the Degree of Bachelor of Engineering shall be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. The examination shall be held in the following branches :—

- (1) Civil Engineering,
- (2) Mechanical Engineering,
- (3) Electrical Engineering,
- (4) Mining Engineering,

and the Diploma shall state distinctly in which branch the candidate has qualified.

3. Any under-graduate of the University may be admitted to this Examination, provided he has prosecuted a regular course of study in a College affiliated to the standard of B.E. Examination for two academical years after passing the Intermediate Examination in Engineering in class, laboratory and workshop, in the particular branch in which he presents himself for examination.

4. A candidate shall not present himself for examination in any one year in more than one branch, but a Bachelor of Engineering who has graduated in one branch may present himself for examination in another branch, provided he has prosecuted a regular course of study in a College affiliated to the standard of the B.E. Examination for one academical year after passing the B.E. Examination, in class, laboratory and workshop in the special subject of the branch in which he presents himself for examination. He shall be excused attendance and examination in subjects in which he has previously passed.

5. The B.E. Examination shall be divided into two sections as follows according to the limits laid down in Section 7 :—

#### PART I

*B.E. (Civil Engineering)*

Mathematics, Science and Engineering.

***B.E. (Mechanical Engineering, Electrical Engineering,  
Mining Engineering.)***

**Mathematics and Science**

**PART II**

***All Branches of Engineering***

**Engineering and Design**

A candidate may be permitted to present himself for Part I at the end of the First-year of the B.E. course and in the event of his failing in any one group he may be allowed to present himself again for examination in that group at the B.E. Examination, provided that a candidate securing pass marks in each group but failing in the aggregate may be allowed to present himself for re-examination in one or more groups when appearing at the examination. Such a candidate may obtain credit for the remaining group or groups of Part I but he shall not be allowed to pass in Part II unless he has previously passed in Part I.

6. Every candidate for admission to Part I of the examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate together with a fee of Rs. 30, at least fourteen days before the date fixed for the commencement of the examination.

A similar rule shall be observed in regard to the registration of a candidate's name for Part II of the examination, in which case the fee shall amount to Rs. 50 irrespective of whether the candidate has previously passed or failed in subjects of Part I of the examination.

A candidate who fails to pass or to present himself for either examination shall not be entitled to a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of fees of like amounts to those above noted.

7. Every candidate shall be examined in—

- (i) Mathematics.
- (ii) Science.
- (iii) Engineering.
- (iv) Drawing and Design.

The limits of the subjects shall be as follows:—

## Part I

### MATHEMATICS

#### (A) THEORY

##### (a) *Calculus and Technical Applications*

Partial differentiation—Taylor's Theorem and Allied topics—Applications.

Intergration in Series—Fresnel Intergral, Simple properties of Beta and Gamma functions—Applications.

Fourier Series—Practical Harmonic Analysis—Separation of Hermonics—Applications.

Differential Equation—Standard First order equations—Clairaut's Form—Linear equations with constant co-efficients—Linear equation of the second order—Intergration in series.

Numerical solution of Differential Equation—Runge's and Adam's Method—Picard's Method of Approximate solution—Semi-graphical Methods.

Theory of Planimeters and other integrators.

##### (b) *Algebra and Trigonometry*

Determinants—expansion of determinants of the third order—properties of determinants—solution of a system of linear equations—elimination—product of two determinants.

Convergency and Divergency of series—limit of sequence—Cauchy's Principle of Convergence.

$$\text{Tests} \quad \lim_{n \rightarrow \infty} \frac{u_n}{u_{n-1}} = 1, \quad \lim_{n \rightarrow \infty} n \left( \frac{u_n}{u_{n+1}} - 1 \right) \begin{matrix} > \\ = \\ < \end{matrix} 1$$

Complex number—Argand's Diagram—DeMoivre's Theorem—Expansions of  $\sin a$ ,  $\cos a$ —Exponential values of  $\sin a$ ,  $\cos a$ —Separation of Real and Imaginary parts in  $(x+iy)^{a+ib}$ —Inverse Trigonometric functions—Gregory series—Hyperbolic functions.

Theory of Errors—Probability—Method of Least Square—Correlates—Application to Engineering production and problems in Geodetic surveying.

*(c) Elements of Spherical Trigonometry*

Spherical Triangle—Area of a lune—Area of a spherical triangle—spherical excess—Solution of right-angled triangle—Napier's Rule—Solution of the general spherical triangle.

*(B) APPLICATIONS**(a) Vectors and Technical Applications*

Addition—Scalar and Vector—Multiplication of two vectors—Products of three vectors—Application to Mechanics and Electrical Engineering.

*(b) Statics*

Three Dimensional Frame work—Statically Indeterminate Frame work—Deflection of Frame work—Principle of Virtual work applied to Flexible chains—Principle of Least Energy and Application—Stability.

*(c) Dynamics of a Particle*

Resisted Rectilinear Motion and Application—Damped and Forced Vibration and Application—Resisted Projectile—General Uniplanar motion—Bridge Oscillation.

*(d) Dynamics of Rigid Bodies*

Moments and Products of Inertia—D'Alemberts's Principles—Motion in two dimensions—Conservation of Momentum and Energy—Impulsive Motion—Stresses induced in rods due to Motion—Technical applications—Railway Mechanics—Vehicle on Railway tracks—Determination of Heights of Coupling and Buffers—Effect of springs in vehicle—Self-propelled vehicle—Gyrostats and gyroscopic action—Miscellaneous technical problems.

## SCIENCE

## GEOLOGY

*(For Candidates in Civil Engineering only)*

*(a) Physical Geology*

A general view of the earth. Rocks and minerals. General characters of igneous, sedimentary and metamorphic rocks.

Weathering and disintegration of rocks by atmospheric agents. Denudation by rivers, glaciers, wind and the sea. Results of weathering. Deposition of detritus. Consolidation of sediments: lamination and stratification. Volcanoes: form, structure and products; types of eruption. Mode of occurrence of igneous rocks, dykes, sills, necks or piles, laccoliths and batholiths. Secular movements of the earth's crust. Earthquakes.

### (b) *Structural Geology*

Results of crustal movements; folding of strata: folds, dip, strike. Fracturing; normal and reverse faults, hade, throw and heave, dip and strike faults, and their effects on outcrops; step, trough and ridge faults; origin of faults. Joints and cleavage planes. Relation of folds, faulting and joints to engineering works. Conformable and unconformable strata: overlap.

Outcrops; effects of topography on outcrops, tracing of outcrops, thickness of strata and their measurement.

*(To be accompanied by exercises in constructing geological sections, solution of problems in geological structures and practice in the reading of geological maps.)*

### (c) *Palaeontological Geology*

Fossils: their mode of preservation; rocks in which they occur. Importance of fossils in stratigraphical geology.

### (d) *Stratigraphical Geology*

Leading principles of stratigraphy. A brief outline of Indian stratigraphy.

### (e) *Petrology*

*Igneous rocks.*—Texture, relation of texture to mode of occurrence. Classification. Characters and essential constituents of the more important igneous rocks.

*Sedimentary rocks.*—Characteristics. Mode of origin and classification. General description of the different sedimentary rocks.

*Metamorphic rocks.*—Kinds of metamorphism. Characteristic structures. General description of commoner kinds of metamorphic rocks.

*(To be accompanied by exercises in the recognition of rocks from hand specimens.)*

(f) *Crystallography*

Symmetry, Systems and their symmetry.

(g) *Mineralogy*

Physical properties of minerals in general.

Particular description of the following minerals:—

*Native elements*—Graphite, diamond, gold.

*Sulphides*—Pyrite, galena, sphalerite, chalcopyrite.

*Oxides*—Quartz, corundum, magnetite, hematite, limonite, braunite, pyrolusite, psilomelane, chromite, cassiterite, bauxite, laterite.

*Oxysalts*—

*Carbonates*—Calcite, dolomite, magnesite.

*Sulphates*—Gypsum.

*Phosphates*—Apatite.

*Silicates*—Feldspar group, feldspathoid group, pyroxene group, amphibole group, olivine, muscovite, biotite, talc, serpentine.

(h) *Ore-deposits*

Form, origin and classification of ore-deposits. Enrichment of ore-deposits.

(i) *Engineering Geology*

Road metal, ballast, building stones. Surface and underground water supply. Dams and reservoirs. Tunnels and cuttings. Foundations, building sites. Stability of hill slopes. Quarrying. Protection of coast and river banks from erosion

(For Candidates in Mining Engineering only)

(a) *Astronomical Geology*.—Information obtained from meteorites and by the spectroscope. Probable history of the earth in its earliest stage of existence.

(b) *Geognosy*.—Probable internal condition; evidences of pressures and internal heat.

(c) *Petrography*.—Essential and accessory constituents. Classification of rocks. Characters and essential constituents of the more important Indian rocks.

(d) *Dynamical Geology*.—Volcanic phenomena. Theories of volcanicity. Hot springs. Earthquakes. Secular upheaval and depression. Geological functions of air. Geological functions of water and ice. Chemical and mechanical actions, denudation

and deposition; landslips. Peculiarities of Indian rivers. Lakes, Geological functions of plants and animals; coral islands.

(e) *Petrogenetic Geology*.—Origin of coal-beds. Origin of laterite. Origin of rock-cleavage. Ore deposits: origin and classification.

(f) *Architectonic Geology*.—Forms of bedding. Surface markings. Concretion. Overlap. Groups of Strata. Joints. Strike and dip; outcrop; monocline; syncline; anticline. Faults, origin and kinds. Intrusive phase of eruptivity; bosses, sheet, dykes, necks; interbedded phase of eruptivity: lavas, tuffs. Unconformability.

(g) *Palæontological Geology*.—Object, conditions for the entombment of organic remains. Preservation of organic remains in mineral masses; fossilization. A general account of the uses of fossils in Geology.

(h) *Historical Geology*.—Leading principles of stratigraphy.

(i) Indian Geology—

#### (I) *Pre-Cambrian History*—

1. The Archæan Group. The ancient gneisses and schists; Dome gneiss anorthosites; the charnockite series; norites and pegmatites. The Dharwarian system.
2. The Purana group. Lower and Upper sub-divisions. Outlines of the Kaddapah, Karnul and Vindhyan systems. The Unfossiliferous Rocks of the Outer Himalayas.

#### (II) *Cambrian and Post-Cambrian History*—

3. The Dravidian Group. The Cambrians of the Salt Range. Outlines of the distribution of the Dravidian formations in the Himalayas and in Burma, the Vaikritas and Haimantas.
4. The Aryan Group. Outline of the Aryan History of the Salt Range and of the Himalayas; the Sirmurs and Siwaliks; sub-divisions and petrology. Outlines of the history of Sind, Baluchistan, and Burma during tertiary times. The Aryan history of the Peninsula. Gondwana Land; evidence of the existence of an old Indo-African continent: Lower and Upper Gondwanas; stages; a more detailed account of the Raniganj, Jharia and Giridih coal-fields. The Cretaceous rocks of Madras and Assam. The Great Deccan Outburst. Laterite. Regur. The Indo-Gangetic Plain.

(j) *Field Geology*.—Geological surveying instruments. Tracing of boundaries and faults. Sections; how to find direction and amount of dip; Dalton's construction. Levelling; surface

profile: datum level; bench marks; methods of geological leveling. Lithology; practical exercises in the identification of Indian rocks.

## MINERALOGY

(For Candidates in Mining Engineering only)

(a) Properties of crystals independent and of direction.

Density and specific gravity; methods of determining specific gravity; hydrostatic balance; Jolly's balance; pycnometers; flotation methods.

(b) *Physical Crystallography*.—Cleavage; fracture; hardness.

Optical properties of minerals. Kind and degree of lustre. Double refraction and polarisation. Nicol's prism. Classification of crystals according to their optical properties.

Examination of crystals in parallel and convergent polarized light; Pleochroism.

(c) *Geometrical Crystallography*.—Relation of physical properties to geometrical form. Crystalline form; faces. Planes and axes of reference; parameters; indices; symbols. Law of relationality of indices. Miller's notation. Parametral form; its selection. Symmetry; planes and axes. Systems. Simple form and combinations. Habit. Isomorphism and heteromorphism. Crystalline aggregates. Measurement of angles; contact and reflecting goniometers.

(d) *Chemical Mineralogy*.—Outline of classification of minerals. Group tests.

(e) *Descriptive Mineralogy*.—A general description of the following minerals:—

*Elements*—Graphite, diamond, gold.

*Sulphides*—Pyrite, galena, sphalerite, chalcopyrite.

*Oxides*—Corundum, hematite, magnetite, quartz, cassiterite, limonite, manganese ores, bauxite.

*Oxysalts*—

(i) *Carbonates*—Calcite, dolomite, siderite, aragonite.

(ii) *Sulphates*—Anhydrite, gypsum.

(iii) *Phosphates*—Apatite.

(iv) *Silicates*—Tourmaline, olivine, garnet, muscovite, biotite, talc, serpentine, pyroxene amphibole, the feldspars.

*Haloid salts*—Halite, fluorite.



## APPLIED MECHANICS AND GRAPHICS

*(a) Buildings*

Consideration of materials used in the construction of roof-trusses. Steel and timber. Determination of stresses in trusses by various methods. Dead-loads and wind pressure. Factors of safety and working stresses.

Design of roof-trusses, various types of roof-trusses and roof coverings. Design of purlins, members and joints. Efficiency of joints.

Use of Euler's, Gordon's, Rankine's, Fidler's, Johnson's and straight line formulæ in the design of struts. Buckling factor of struts; curves showing comparative strength of struts obtained by various formulæ. Choice of size of sections. Finish of steel work. Joints. Design of end-bearings; methods of fixing and supporting ends.

Application of circles and ellipses of stress and Claypeyron's theorem to design of structures.

Cast Iron and Steel Columns.—Flange and web connections to steel columns; caps; bases.

Foundations—Safe pressure; foundations for columns. Slab foundations; cantilever foundations; grillage foundations.

Tall Masonry and Steel Chimneys.—Theory and design.

Deflection of framed structures.

Influence diagrams for bending moment and shear for uniformly distributed and irregular loads on beam trusses, built in beams. Principles of Building Design; consideration of loads on buildings. Steel-work girders, etc., for buildings.

Design of Architraves, Floor joists, lintels.

Distribution of shear on rectangular beams, R. S. Joists.

*(b) Bridges*

Design of superstructure. Determination by graphical and analytical methods of bending moment due to moving loads. Wind-pressures.

Design of masonry bridges and culverts.

Plate web girders. Analysis of stresses.

Warren and lattice girders.

Three-pinned arches.

General considerations on the design of suspension, cantilever, and tubular bridges.

*(c) Reinforced Concrete*

Shear, bond and diagonal tension, its nature, evaluation and location of reinforcement.

Design of simple and doubly reinforced beams and continuous beams.

Design of Tee Beams and Slabs.

Theory and design of reinforced concrete columns, column footings and piles.

Design of slab foundations.

Design of simple cantilever and counterfort retaining walls.

Equivalent moments of inertia for reinforced concrete sections.

#### (d) *General*

Analysis of stress, analysis of strain, elastic limit and ultimate strength. Relation between the elastic constants. Launhardt-Weyrauch formula for working stresses in a structural member and determination of its cross-sectional area. Repetition of stresses. Bending moment and shearing force diagrams for dead loads. Graphical determination of stresses in frames; effect of wind pressure; method of sections. Stress in the cross section of a beam due to bending ( $M/I = f/y = E/R$ ); compound and conjugated stresses. Rankine's theory of earth-pressure; depth of foundations and strength of footings. Grillage foundations; Coulomb's theory of earth-pressure; modification due to Rebahn.

Bending moment and shearing force diagrams for live loads. Analysis of uniform and uniformly varying stress. Elastic theory of bending of beams; bending and shear stresses in beams. Modulus of section and equivalent areas. Maximum and minimum stresses in a joint due to eccentric loading. Stresses in dams and chimneys. Stability of block work structures. Design of riveted joints and stresses in boiler shells. Euler's theory concerning struts, modifications due to Rankine, Gordon and others. Torsion. Combined torsion and bending deflections. Encastre beams. Continuous beams and theorem of three moments.

### METALLURGY AND TECHNICAL CHEMISTRY

(For Mechanical, Electrical and Mining Engineering Candidates only)

#### *Theoretical*

#### **A**

Brief study of the manufacture and properties, with special reference to their use in engineering of the common non-ferrous metals and their alloys; cast iron; wrought iron and steel. The

influence of impurities upon metals and alloys. The alloy steels. The crystalline structure of metals with special reference to their mechanical properties. The effect of mechanical work on metals. Fracture of metals and their crystalline structures. Crystallisation and fatigue of metals. Brief study of Phase Rule and equilibrium diagrams with special reference to metals and alloys. Iron-carbon system. Hardening, tempering, annealing and normalising of steel. Case-hardening of steel. Corrosion of iron and steel, methods of preventing corrosion.

Chemistry of accumulator cells.

Chemistry of boiler water; softening of boiler water; boiler scale, its composition and effect on boiler. Sterilisation and filtration of water.

Solid, liquid and gaseous fuels. Indian coals. Distillation of coal; products of distillation and their utilisation. Sampling and analysis of fuels.

## B

Chemistry of combustion. Calculation of volumes and weights of air necessary for combustion of fuels. Calculation of heat losses. Composition of flue gases and its interpretation.

Chemistry of lubricating oils and greases.

## *Practical*

### A

Gravimetric analysis:—Simple determination of copper, iron, aluminium, magnesium, chloride, sulphate and silica.

Volumetric analysis:—Acidimetry and alkalimetry.

Determination of permanent and temporary hardness of water. Determination of iron and calcium by permanganate. Determination of chlorine in bleaching powder.

Preparation of at least two commercially important compounds in the Laboratory.

### B

Analysis of coal and flue gases. Determination of calorific value of coal.

Determination of viscosity, flash point, fire point, specific gravity, free acid, saponification number, Mannem test, Conradson test, emulsification test of oils.

**TECHNICAL CHEMISTRY**

*(For Candidates in Civil Engineering only)*

*Theoretical*

Brief study of the manufactures, properties and uses in engineering of iron, nickel, copper, zinc, aluminium, tin, lead and antimony and their principal alloys. Hardening, tempering, annealing, normalizing and case-hardening of carbon steel. Corrosion of iron and methods of protection of iron from corrosion.

Chemistry of water as used for boiler and drinking purposes.

Solid, liquid and gaseous fuels; their preparation, composition and uses for various purposes.

Manufacture and properties of limes, cements and plasters. Composition and properties of clays and products obtained from them.

*Practical*

Determination of hardness of water; determination of chloride, sulphate, iron and calcium. Analysis of lime and Portland cement.

**APPLIED PHYSICS**

*(For Mining Engineering Candidates only)*

*Theoretical*

Theory of refrigeration. Technical thermometry. Viscosity of liquids. Polarised light. The theory of illumination. Discharge of electricity through gases; radioactivity; electrical structure of matter. Elementary ideas of Thermionics. Photo-electricity and X-rays and their applications. Cathode ray oscillograph. Elementary principles of wireless communication.

*Practical*

Testing of spirit levels. Young's modulus by extensometer and bending. Influence of temperature on Young's modulus. Modulus of rigidity by static and kinetic methods. Moments of Inertia, Kater's pendulum. Viscosity of liquids. The ratio of  $C_p/C_v$  for gases. Pyrometric measurement, Thermal conductivity. Mechanical equivalent of heat. Photometric measurements. Intensity of heat and light emission from a heated wire. Polarimeter. Valve characteristics. Wireless detection and amplification.

*(For Mechanical and Electrical Engineering Candidates only)*

Engineering Metrology.

Measuring Tools, Micrometers, Verniers, Callipers.

Micrometer depth gauges., Ames dial gauges.

Whitworth Measuring Machine.

The Hirth Minimeter. Johansson Gauges.

Methods of measuring the various elements of a screw.  
thread.

Core diameter. Effective diameter. Pitch.

Screwed rings.

Multiple Production Work.

Limit Gauges. Limits on work.

Workshop Gauges. Inspection Gauges.

Limits on Gauges.

Trigonometry of the tool room.

Jigs.

Metal-cutting tools.

Treatment of tool steels and tools.

High speed tool steels.

Case-hardening.

Precision Grinding.

Welding, etc.

### LABORATORY WORK

Use of measuring tools mentioned in the lecture syllabus.  
Measurements of the various elements of screw gauges. Test-  
ing the dimensions of various types of fine limit gauges.

Use of various measuring machines such as the Pratt and  
Whitney or the Newall Measuring Machine, making several  
types of fine limit gauges in the workshops such as—

- (a) Plug Gauge to an accuracy of 0.0003.
- (b) Plate Gauge (gaps) to an accuracy of 0.0005.
- (c) Jigs for drilling work, etc.

### PRIME MOVERS

*(For Candidates in Civil Engineering only)*

*Fuel, Gas Plants and Boilers—*

- (a) Fuel—Coal, wood, petroleum, gas, petrol, alcohol,  
etc., physical characteristics, approximate chemi-  
cal composition, heat of combustion.
- (b) Gas plants—Gas Producers; pressure and suction  
plants; arrangement and working.

- (c) Boilers—Draught, natural, forced and induced. Ordinary forms of stationary, locomotive, marine, water-tube, and other types; heating surface, fire-grate area, boiler efficiency; superheaters; feed-water heaters; accessories and management.

*Theory of Heat Engines—*

- (a) Thermodynamical principles; Carnot's cycle; perfect heat engine; second law.
- (b) Air Engines—Stirling and other forms.
- (c) Internal Combustion Engines—gas, oil and petrol engines with fluid pistons; types and working; features of cycles. Proportioning of mixtures; efficiencies.
- (d) Steam—Thermodynamics of the generation, expansion and condensation of steam; heat diagrams, etc.
- (e) Steam Engines and turbines, with special reference to modern developments.
- (f) Refrigerating Plant—Theory and general arrangement of the more common types.
- (g) Air Compressors—Theory of pneumatic working.

*Generating Plants, Accessories and Details—*

- (a) General arrangements and construction of the more important types.
- (b) Condensers, air-pumps, circulating pumps, cooling tanks, etc.
- (c) Carburettors, and systems of ignition.
- (d) Cylinders, pistons, cross heads, guides, connecting rods, cranks, governors, fly-wheels, valves and valve gears, glands and pipes.
- (e) Engine-testing—Consumption of steam and fuel, gas and oil; brakes and dynamometers; indicators and indicator diagrams.

## ELECTRICAL ENGINEERING

(For Candidates in Civil Engineering only)

### *Theoretical*

Load characteristics of D. C. generators and motors; armature winding—lap and wave; starting and speed control of different types of motors; general theory and construction of starters for motors; parallel and series running of generators and motors; losses and efficiency of D. C. machines; two-wire

and three-wire D. C. systems; balancers—static and rotary; illumination by D. C. power; theory and construction of commercial D. C. instruments; alternating currents; complex circuits; symbolic method of calculating A. C. circuits; single and polyphase systems; measurement of A. C. power in single- and three-phase systems; comparison between single-phase and polyphase systems; production of rotating magnetic field; theory and construction of alternators and transformers; simple methods of finding the regulations of alternators and transformers; main working principles of synchronous and asynchronous motors and rotary converters; A. C. commercial measuring instruments; simple problems on A. C. transmission lines. Principles of telegraphy and telephony; simple oscillatory circuits. Lightning conductors.

### *Practical*

Measurement of self inductance, mutual inductance and capacitance; measurement of permeability; B.-H. curves; measurement of hysteresis loss; uses of Siemen's electric dynamometer and Kelvin's balance; measurement of flux by fluxmeters; measurement of insulation resistance of cables. Testing of lightning conductors..

Load characteristics of D. C. motors and generators; efficiency tests on D. C. motors and generators; no-load and load characteristics of transformers and alternators; no-load and short-circuit tests on induction motors; no-load tests of rotary converters; simple experiments on A. C. circuits; effect of inductance and capacitance.

## **Part II**

### **APPLIED MATHEMATICS**

*(For Electrical Engineering Candidates only)*

#### *First Half*

Expansion of a function in harmonic series. Simple harmonic analysis. Analysis of E. M. F. current waves, and different field forms. Graphic method of analysis, Runge's method. Comparison of different methods, their accuracy. Fourier's theorem and its application to the flow of heat and electricity.

Theory of free and forced oscillations. Critical damping, and damping effect of different resisting forces. Application to different electrical instruments. Differential equations of oscillating circuits and of vibration of different elastic members such as controlling spring of instruments. Calculation of natu-

ral period of vibration of thin discs, thin blades (*e.g.*, turbo-rotor blades), thick rotating cylinders (*e.g.*, turbo-rotors); their application to turbo-ships. Nodal drive system.

Vectors, vector-algebra and vector-analysis as applied to Electrical Engineering. Elementary theory of Quaternions.

### *Second Half*

Mathematical theory of Electricity and Magnetism. Electrostatic field of force. Theorems of Gauss and Maxwell. Lines and tubes of force. Poisson's equation. Distribution of charge on spheres and cylinders. Capacity of condensers. Submarine cable. Losses in transmission lines, calculation of impedances. Propagation of electromagnetic waves over a long distance transmission line—reflection of waves—attenuation constant.

Flow of current in linear circuits. Network of conductors. Induction of currents in linear circuits. Co-efficients of self and mutual induction. Differential equations of induction. Production of eddy-currents, losses due to eddy-currents. Interpretation of various differential equations as applied to Electrical Engineering.

## ENGINEERING—APPLIED MECHANICS

*(For Mechanical, Electrical and Mining Engineering  
Candidates only)*

### *Definitions*

Elasticity :—Elasticity and rigidity. Stress, its nature and intensity. Tensile, compressive, and shearing stresses. Positive and negative senses of stress. Stresses of uniform and variable intensities. Ultimate strength. Factor of safety.

### *Tension*

Simple tension :—Work done in stretching a rod. Thin pipes under internal fluid pressure. Strength of prismatic solids under tensile stress when the resultant of applied forces does not coincide with the axis of the solid. Safe tensile co-efficients of various materials.

### *Compression*

Classification of bars or pillars under compression :—Very short pillars, short pillars, long pillars, very long pillars. Methods of failure of these classes of pillars. Rondolet's, Hodgkinson's and Gordon's formulæ. Euler's formula. Fairbairn's formula for collapsing of tubes under fluid pressure. General remarks on



the applicability of the above formulæ. Safe compressive co-efficients of materials usually subjected to a compressive stress : impact, pile driving.

### *Transverse Strain*

Proof that the stress at each point varies as its distance from the neutral axis.

Determination of the position of the neutral axis.

Determination of the moment of resistance.

Calculation of moments of inertia of ordinary section used in engineering construction.

Flanged girders—approximate and accurate methods.

Proportion of I beams for equal strength.

Beams of uniform strength.

Bending moments and shearing forces (treated graphically and analytically).

Cantilever under single load at free end.

Cantilever under uniformly distributed load.

Cantilever under uniformly distributed load, and one or more detached loads.

Beams supported at the ends and loaded with detached loads at any point.

Beams supported at the ends and loaded uniformly.

Beams supported at the ends and loaded uniformly, and also with one or more detached loads.

Beams supported at the ends and loaded with a single detached moving load.

Beams supported at the ends supporting an uniformly distributed moving load of length less than the span.

Beams supported at the ends supporting an uniformly distributed moving load of length greater than the span.

Beams supported at the ends loaded at intermediate points. Conversion of the detached loads into equivalent uniformly distributed load. The theory of three moments for uniform beams.

### *Statics of Structures*

Framework loaded at joints.

Triangular frames :—Diagram of forces for a single triangular frame. Triangular trusses. Cranes and dericks. Sheerlegs and tripods. Effect of the tension of the chain in cranes.

Incomplete frames :—Preliminary ideas. Simple Trapezoidal or queen post truss. General case of a funicular polygon under a vertical load. Suspension chains.

Compound frames :—Compound triangular frames for bridge trusses. Roof trusses in timber. Queen truss for large iron roofs. Diagram of forces in general.

Framework girders :—Warren girders under various loads. Nitrusses. Bowstring girders.

Girders with redundant bars :—Lattice girders, flanged beams.

Deflection of structures, influence lines.

### *Deflection of Beams*

Deflection due to the maximum bending moment. General equation of deflection curve. Elementary cases of deflection and slope. Beams propped in the middle. Stiffness of beams. Stiffest beam that can be cut from a circular log.

### *Shearing*

Distinction between tangential stress and normal stress. Equality of tangential stress on planes at right angles. Tangential stress equivalent to a pair of equal and opposite normal stresses. Web of a beam of I section. Method of computing the intensity of the shearing stress at any point in a bent solid.

### *Resistance of Prismatic Solids to Simple Torsion*

Explanation of the phenomena of simple torsion.

A circular section, solid or hollow, most favourable form of prismatic solid for resistance to torsion.

Twisting moment. The limiting intensity of the resistance to torsion is that of the shearing stress.

Investigation of the resistance of a circular prism to torsion round its mean fibre.

The strength of axles subject to simple torsion. Values of the limiting intensity of working resistance to simple torsion for different materials.

Diameter of a shaft to transmit a given power.

Extension and torsion of spiral spring.

### *Blockwork Structures*

Stability at a plane joint. Stability of a series of blocks. Centres of pressure or resistance. Line polygon and curve of pressures : Line of resistance, or polygon of centres of pressures, moment of stability.

**APPLIED MECHANICS**

*(For Civil Engineering Candidates only)*

*(a) Buildings*

Collar beam and hammer beam trusses.

Cast Iron and Steel Columns—Transverse bracing of columns.

Foundations—Wells, Piles.

Retaining Walls and Earth pressures—Rankine's theory, Wedge theory, Winker's and Bligh's graphical constructions, with corrections. Design of various types of retaining walls in masonry.

Design of steel and masonry reservoirs, with consideration of wind-pressures.

Determination of stresses, etc., in redundant frames, and three-pinned, parabolic, semi-elliptic and semi-circular arches.

General principles of dome design.

*(b) Earthquake-Proof Structures*

Values of Seismic force for different localities.

Framework of the structure—Reinforced concrete, brick or steel with their merits and demerits.

Different types of panel fittings, their heat, insulation properties and relative costs. Nature of suitable roofs.

Articulation joints for massive buildings.

Small isolated buildings requiring no framework.

Stresses in members of a four-sided closed frame with single, double and multiple bays and estimation of their cross sections. Design of panel fittings for the above.

*(c) Bridges*

Doubly pinned and rigid arches.

Steel-arched bridges.

Swing bridges.

*(d) Reinforced Concrete*

Theory of elastic deflections and outline of investigation of stresses in reinforced concrete arches.

*(e) General*

Elastic theory of arches. Masonry arches.

## GEODESY

(For Civil Engineering Candidates only)

*Surveying.*—Various causes of errors in levelling. Elimination of such errors. Customary limits for errors. Theory and use of the stadia method of plane-tabling with levelled heights and reductions of distances and heights by slide-rule. The three-point problem or plane-tabling by resection from within and without the triangle. Geometrical and trigonometrical proof of the three-point problem. The two-point problem with and without the magnetic compass. Triangulation with reciprocal value; heights of stations; base line measurements. Finding values of position by observations to three known points.

Contouring of the triangulated areas by heights calculated from the reduced levels. The location on the map of a road, railway, canal, or weir, etc. The general principles of tunnel alignment and of carrying surface meridians underground for mine-surveys. Discussion on the latest patterns of instruments.

Practical Astronomy. Introduction to spherical trigonometry up to the solution of the spherical triangle, and the adaptation of Napier's rules of circular parts. Definitions; systems of celestial co-ordinates; the reasons for sidereal, sun and mean time; acceleration, retardation and equation of time. The Julian and Gregorian calendars; time and the various astronomical corrections.

Finding the meridian of a place by observations to the sun or at upper culmination by equal altitudes, by the sun or stars not in the meridian, and by circumpolar stars at elongation; and finding time by the sun or stars on the meridian and ex-meridian; finding latitude by polaries and circum-meridional observations. Use and construction of sun-dials.

*Railway Curves and Alignments.*—Theory of curves. Curves laid out with the aid of angular instruments; with one theodolite. Curve by ordinates from the long chord. Curve with certain given data to pass through a ruling point. Compound curves. Diversion curve. Vertical curves. Curve spiral or transition curve. Double-centre method for laying out a straight-line.

## HYDRAULICS

(For All Candidates)

### General Principles

Velocity and volume of flow. Principle of continuity. Flow in a stream. Steady and varying motion of streams. Fluid acting on piston. Theorem of Bernoulli. Hydraulic head.

### *Flow of Liquids through Orifices*

Application of the theorem of Bernoulli. Velocity of flow due to given head. Co-efficient of velocity. Co-efficient of contraction. Co-efficient of discharge. Co-efficient of resistance. Connection between co-efficient of velocity and resistance. Discharge from large rectangular orifices. Borda's mouth-piece. Co-efficient of contraction of Borda's mouth-piece obtained theoretically. Incomplete contraction. Cylindrical and conical mouth-pieces. Flow-over notches. Triangular notches. Velocity of approach. Application of results to measurement of flow in streams. Francis's formula. Discharge of measured quantities of water for irrigation purposes. Italian and Spanish modules. Other forms of apparatus answering the same purpose. Discharge under varying head. Jet pump. Separating weirs.

### *Flow of Liquids in Pipes*

Law of friction between liquids and surfaces. Froude's and Unwin's experiments. Loss of head due to friction in pipes.

Hydraulic mean depth. Variation of co-efficient with velocity and diameter. Darcy's Formula. Hydraulic gradient. Ordinary computations of size of pipes and volume of discharge. Loss of head due to bends, elbows, enlargements etc.

### *Impulse and Reaction of Water*

Pressure of a jet on a plane surface, fixed or moving. Energy communicated to the moving surface and efficiency of jet. Velocity of surface for maximum efficiency. Resultant pressure on curved surface, direct impulse and reaction. Condition to avoid loss by shock when jet is received. Condition for least loss of kinetic energy when jet is discharged.

Accumulators, hydraulic lift, hydraulic riverter, etc.

The Pelton wheel, Nozzles, Buckets, Impulse and Reaction turbines, Francis turbine. Mixed flow turbine. Design of guide blades and vanes. Modern research on turbine design.

Governing. Efficiency tests.

Centrifugal Pumps—design of vanes. Centrifugal heads—lowest speed to begin pumping.

Vortices : design of casing. Volute and whirlpool chambers. Frictional losses. Multiple lift centrifugal pump.

Efficiency tests : Reciprocating pumps : Effect of cavitation in Reciprocating pumps : Diagram of effective pressure : Air lift pumps. Air compressors.

The course in Hydraulics will be accompanied by a course of practical work in the Hydraulic Laboratory.

(For Civil and Electrical Engineering Candidates only)

*Movements of Water in Canals and Rivers*

Mean velocity corresponding to given gradient. Variation of the co-efficient. Velocity at different parts of the section of the stream. Mean velocity in terms of surface and bottom velocity. Ratio of mean to maximum velocity. Forms of section of channel, circular, trapezoidal egg-profile. Most economical section of canal with given side-slopes. Form of section for a constant velocity with varying discharge.

IRRIGATION

(For Candidates in Civil Engineering only)

Irrigation by "Lift and Flow."

Different methods of *Lift Irrigation* from wells, tube-wells and rivers by means of man, animal, wind, steam, gas and electric power.

*Flow Irrigation*.—(a) from rivers by inundation, (b) from rivers, tanks or reservoirs, by means of dams, weirs or barrages. Dams.

*Control*—Distribution and regulation of water supply. Losses of water in transit and methods of reducing the same. Duty of water. Measurement of water.

*Canal cross drainage works*—Application of Hydro-electricity of Irrigation. Irrigation surveys and projects. Benefits of Irrigation.

*River training and control* by embankments, spurs, revetments, bell-bunds, dredging.

Flood protection by embankments and reclamation. Effect of tides and floods in Deltaic Tracts. Uses and evils of Embankments.

Over-irrigation and its evils. Necessity of drainage in irrigated, deltaic and tidal tracts. Preparation of drainage projects in tidal and upland areas.

*Navigation* and its importance. Navigable canals and canalised rivers for tidal and non-tidal areas.

Disposal of cross-drainages.

## PUBLIC HEALTH ENGINEERING

*(For Candidates in Civil Engineering only)**Water Supply—*

*Sources of supply*—Catchment areas; rivers; lakes; springs; masonry wells; tube-wells; rainfall observation; compensation water, gauging streams.

*Reservoirs*—Impounding; storage and service reservoirs; water towers; suitability of sites.

*Quality of Water*—Impurities of various kinds, organic and inorganic; chemical and bacteriological examination of water; collection and care of samples; interpretation of analytical reports; hardness.

*Water-works*—Intakes; settling tanks; slow-sand filters; mechanical filters; water softeners; iron eliminators; rates of filtration; coagulation apparatus; chlorination apparatus.

*Conveyance of water*—Rising mains; distribution mains; strength of different kinds of pipes; loss of head; hydraulic gradient; pressure control and zoning system; house connections; hot water supply; use of meters; use of house and roadside cisterns; valves; expansion joints.

*Pumping Installations*—General types of installation, steam, oil or electric drive; tube-well pumps; house pumps; sewage pumps.

*Sewerage—*

*Sewerage systems*—Combined or separate sewers, their construction and ventilation; self-cleansing velocity; manholes; dumping chutes; interceptor gulley pits; flushing chambers.

*House drainage*—Sanitary fittings; traps; soil and anti-siphonage pipes; drain testing.

*Sewage Disposal—*

*Refuse removal and disposal*—Reclamation of waste ground; incineration; river pollution and its effects.

The chemistry of sewage.

Disposal by irrigation; sewage farms.

Sea discharge; retention tanks.

*Purification of sewage*—Chemical precipitation; liquefaction of sewage; sewage oxidation, septic tanks; contact beds; trickling filters and distributors; activated sludge process; simplex and bio-aeration processes; mechanical desludging; sludge digestion; utilization of sludge gas; sludge drying beds; mechanical

screening; disposal of septic tank effluent by irrigation, dilution, subsoil galleries, or wells.

### *Surface Drainage—*

Rainfall to be dealt with; selection of outfalls; time of concentration; design of gradients; types of surface drains, *kutcha* and *pucca*; culverts; flood flush drainage and mosquito control.

### *Ventilation—*

The scientific basis of ventilation; industrial pollution of the atmosphere; natural and artificial ventilation; ventilation of auditoriums, factories, mines, air conditioning.

## ROADS

*(For Candidates in Civil Engineering only)*

Classification of Roads.

Types—waterbound, macadam waterbound, tarbound, oil-bound, concrete.

*Resistance*—Grade resistance. Minimum and maximum grade. Effects of both. Ruling gradient. Switch-back.

*Projects*—Survey work. Reconnaissance, alignment, location. Instruments and maps. Estimates. Curves. Super-elevation.

Width, sidewithths, camber, superelevation, sideslopes of embankments and cuttings. Borrow pits and berms. Height of banking and depth of cutting. Free board.

Earthwork, profiling.

Determining thickness of covering.

Foundation and wearing surface.

Selection of metalling, kinds of metalling.

Blindage, size of blindage.

Stacking and measuring.

Spreading and consolidation.

Wear of roads.

Causes and prevention of dust and mud.

Corrugations—their causes and effects.

Surfacing of roads. Tar painting, asphalt painting, tar macadam surfacing.

Grouting and penetration.

## RAILWAYS

*(For Candidates in Civil Engineering only)*

Indian Railways, systems of construction and working. Electric Railways. Gauge.



Earthwork and cutting, drainage, landwidths, ballast.

Various kinds of road crossings—Level, overbridges, underbridges and subways.

Mechanical principles. Resistances—grade, curve, wind and special. Compensation for curvature. Ruling gradient super-elevation. Tractive force, transition and vertical curves.

Permanent way, rails—different shapes and length, chairs, fishplates and fastenings, sleepers—wooden, metal and reinforced concrete, advantages and disadvantages. Points, crossings and connected terms, diamond crossings, double slip, single slip, scissors. Calculations. Creep—its causes and remedies.

Station machinery. Engine sheds, turntables, watering arrangements, cabins, weighbridges, etc.

Station buildings and passenger platforms, waiting halls, overhead sheds.

Station yards, simple wayside, traffic yards, loco yards, signalling, interlocking, elementary principles.

Selection of new lines, points to be borne in mind—final location and construction, rules of Government of India.

Bridges, impact, erection of girders, arch and reinforced concrete slab bridges, design of railway bridges, codes of practice, welding in birdwork.

Maintenance, accidents, floods, general rules and standard dimensions.

## PRINCIPLES OF ARCHITECTURAL DESIGN

*(For Candidates in Civil Engineering only)*

### *(A) History of Architectural Design*

1. Lectures, briefly summarising the various types of "Orders," materials, designs and construction used in—

- (a) Preliminary Classic Styles.
- (b) Greek Architecture.
- (c) Roman Architecture.
- (d) Byzantine and Saracenic Architecture.
- (e) Romanesque Architecture.
- (f) Gothic Architecture.
- (g) Renaissance Architecture.
- (h) Indian Architecture.

2. Practical drawing of Compositions of the Greek, Roman, Renaissance of Indian "Orders."

*(B) Modern Architectural Design*

1. Theory of Architecture (planning, proportions, etc.).
2. Applied Problems in Design.

*(C) Drawing*

Perspective Drawing, Freehand Sketching, etc.

## MECHANICAL ENGINEERING

## STRENGTH OF MATERIALS

Deflection of beams.  
 Compound stresses, Ellipse of stress.  
 Combined bending and twisting. Columns Impact and  
 live loads. Helical springs, Flat springs.  
 Thin Cylinders. Thick Cylinders. Testing Machines and  
 their Calibration.  
 Instruments for measuring elastic strains. Special tests  
 and Machines.  
 Stresses in simple framed structures.

## THEORY OF MACHINES

Effort, Velocity and Acceleration diagrams.  
 Piston Velocity and Acceleration diagrams.  
 Inertia of reciprocating parts. Crank effort diagrams.  
 Design of fly wheels.  
 Governors : Function of a governor. Watt and Porter.  
 Governors : Theory of governors.  
 Brakes and dynamometers.  
 Belt rope and chain gearing.  
 Toothed gearing.  
 Cams.  
 Epicyclic trains.  
 Hooke's joint. Oldham's coupling.  
 Balancing.  
 Centrifugal force.  
 Dynamical load on a shaft.  
 Method of balancing any number of weights in one plane  
 Primary balancing of any number of weights not in one  
 plane.

## HEAT ENGINES

*(For Mechanical and Electrical Engineering Candidates only)*

The fundamental equations of a perfect gas.  
 Adiabatic and Isothermal expansion.

Various Cycles. The hot-air engine.  
Otto Cycle, Diesel Engine Cycle.  
Thermodynamics of the Steam Engine.  
Efficiency of a Perfect Steam Engine.  
Rankin's Cycles.  
Throttling effect.  
Entropy of Steam.  
Entropy Temperature diagrams.  
The Mollier Diagrams.  
Applications of the Entropy-Temperature and the Mollier  
Diagrams to Steam Engine problems.  
Fuel Testing—The Bomb Calorimeter.  
Junker's Calorimeter for gas and oil.  
Fuel Gas—The Orsat gas analysis apparatus.  
The automatic Co-Recording apparatus.  
Loss of heat in flue gases.

*The Steam Engine*—Testing of the Steam Engine.

Analysis of Indicator diagrams.  
The flash light indicator.  
Detection of faults.  
Adjustment of valves.  
Testing and adjusting indicator spring.  
Measurement of the dryness of steam.  
Various forms of dryness fraction Calorimeters.  
Effect of super-heating.  
Internal Combustion Engines.  
Testing of gas and oil engines.

*The Petrol Engine*—Analysis of Indicator Diagrams.

Mechanical and Thermal efficiencies.  
Adjustment of spark, air supply and fuel. Heat balances  
of Gas and Oil Engines.  
The Steam Turbine—General description of various types  
of Steam Turbines.  
Nozzles and guide blades.  
Impulse Turbines. Reaction Turbines.

## MACHINE DESIGN

*(For Mechanical and Electrical Engineering Candidates only)*

Design of Steam Engine, boiler and machine details with  
special reference to the manufacture of the details as well as to  
the strength of the parts.

## MODERN SYSTEM OF WORKS MANAGEMENT AND ACCOUNTS

*(For Mechanical and Electrical Engineering Candidates only)*

Selection of site of works.  
 General arrangement of works, Power, Plant, Ventilation, Humidity.  
 Equipments, Staff, Routine.  
 Correspondence, Office.  
 Production efficiency.  
 Regulations affecting Employees.  
 Factory Acts requirements.  
 Workmen's Compensation Act.  
 Apprenticeship, Records.  
 Time-keeping, Overtime.  
 Recent researches on Fatigue.  
 Drawing office, Tool room.  
 Stores, Inspection, Supervision.  
 Warehousing.  
 Estimates.  
 Works expenditure, Stock-accounts.  
 Shop charges, Stock-taking.  
 Wages accounts, Petty Cash accounts.  
 Sales accounts, Shares accounts.  
 Audit.

## METALLURGY

*(For Mechanical Engineering Candidates only)*

### *Theoretical*

Refractory materials, foundry sands, core-binders and facing materials used in foundry.

Iron.—Iron ores, classification and distribution. Indian iron ores and their occurrence. Preparation of iron ore for smelting. The blast furnace, method of operating. Reactions in blast furnace. Different grades of pig iron. Cast iron and foundry practice. Manufacture and properties of wrought iron.

Steel.—The cementation process of making sheer steel. Crucible and cast steel. Different grades of crucible steel, its characteristics and uses. Bessemer, open hearth, Duplex and electric processes of making steel. Chemistry of different processes of steel making. Recent modifications in open-hearth practice. Comparative merits of steel castings by using small converter. Defects in ingots. Effect of carbon, manganese, sulphur, phosphorus, silicon, etc., on steel.

Composition and characteristics of various grades of steel. Special steels as nickel, nickel-chromium, manganese, high-speed tool steel. Mechanical treatment of steel. Elements of metallography with special reference to iron and steel. Heat treatment of steel.

Brief study of copper, nickel, zinc, lead, tin, antimony, aluminium and their important alloys.

## HEAT ENGINES

*(For Mechanical and Electrical Engineering Candidates only)*

### *The Steam Engine—*

Indicated weight of steam.

Missing quantity. Transference of the indicator diagram on the temperature-entropy diagram.

Valve leakage, steam consumption.

Willan's Law, Compound expansion.

Ratio of Cylinder Volumes, Cylinder dimensions.

Combination of indicator diagrams.

Flow of steam through orifices and nozzles.

Theory of the injector. Types of injectors.

### *Steam Turbines—*

General Theory of the steam turbine.

Descriptions of turbines. Multi-stage turbines. Losses in steam turbines.

Effect of pressure, super-heat and vacuum on efficiency.

Exhaust steam turbines.

### *Air Compressors and Motors—*

Transmission of power by compressed air.

Simple compressors. Two-stage and three-stage compressors.

Air motors. Efficiencies of compressors and motors.

*Gas Producers*—Various forms of producers. Theory of Producer gas.

*Heat Transmission*.—Transmission through flat plates. Efficiency of heating surface. Transmission through the walls of tubes. Effect of high speeds. Heat transmission through condenser tubes.

*Gas Engines and Internal Combustion Engines*.—Research and developments. Gas Engine theory assuming variable specific heat.

Mechanical Refrigeration.  
 Types of refrigeration machines.  
 Vapour compression machines.  
 Co-efficient of performance.  
 Tests of Refrigerators.

### THEORY OF MACHINES

*(For Mechanical Engineering Candidates only)*

Valves and Valve diagrams (Graphical and analytical solutions).

Link motions, Stephenson Gooch, and Allen link motions.

Hackworth, Marshall and Joy Valve gears. Walschaert gear.

Twisting moment diagrams.

Unions of the connecting rod.

Kinetic energy of the connecting rod.

Klein's construction.

Cyclical variation of speed.

*Balancing—*

Balancing of rotating weights in more than one plane.

Primary balancing.

Balancing of locomotives.

Secondary balancing.

Balancing of petrol engines.

*Governors—*

Theory of Governors.

Stability. Sensitiveness. Hunting. Spring-loaded Governors.

Curves of controlling force.

Crank-shaft Governors.

Whirling of shafts.

Vibrations.

### MACHINE DESIGN

*(For Mechanical Engineering Candidates only)*

Students will be required to produce complete working drawings, specifications and estimates of—

- (1) a steam boiler;
- (2) a steam engine;
- (3) a gas or oil engine;
- (4) a Lathe;
- (5) a Centrifugal Pump;
- (6) a water turbine.

The lectures will be arranged to deal with these designs in detail, special attention being given to questions of material, labour and manufacture.

### ELECTRICAL ENGINEERING

*(For Mechanical, Electrical and Mining Engineering  
Candidates only)*

#### *Theoretical*

Armature winding, simple and complex windings, lap and wave; equalising connections; armature reaction; cross magnetising and demagnetising action; theory of commutation, reactance voltage; characteristics of D. C. motors and generators in detail; speed control of different types of motors; starters for D. C. motors, calculation of starter resistances; different methods of calculating losses in various types of motors, determination of efficiency, separation losses, transmission and distribution of D. C. power by two-wire and three-wire systems; uses of balancers and boosters; special machines, constant current generators, auto-converters, dynamotors. Details of indoor and outdoor wiring installations. Illumination engineering. Theory and construction of commercial D. C. instruments.

Alternating current, complex circuits, symbolic method of calculating A. C. circuits, single-phase and polyphase systems, measurement of A. C. power in single-phase and three-phase systems; comparison between single-phase and three-phase systems; production of rotating magnetic fields, induction of rotational and pulsational E.M.F.'s; alternators; equation of E.M.F.; breadth co-efficient, different types of windings characteristics, efficiency and regulation; transformers; induction of E.M.F., equivalent circuit of transformers, efficiency and regulation; main working principles of induction motors; Torqueslip diagrams; simple circle diagrams; general theory and working principles of synchronous motors and rotary converters; common types of A. C. commercial instruments; simple oscillatory circuits.

#### *Practical*

Same as for Civil Engineers.

#### *Drawing and Estimating*

- (1) Complete drawing to scale of a D. C. or A. C. machine,
- (2) Complete drawing for the equipment of a small power station or sub-station, (3) either a complete drawing of a trans-

mission line, A. C. or D. C., or a complete drawing of the electrical installation for a workshop or a large building.

Lectures will be delivered in line with the above Drawing course.

### ELECTRICAL ENGINEERING

*Electrical Engineering Degree students will read the following in addition to the course in Electrical Engineering laid down under the head 'For Mechanical, Electrical and Mining Engineering Candidates only':—*

**Machinery and Apparatus**—D. C.—Ordinary motors and generators, motor generators, boosters, balancers, battery boosters, constant current generators, dynamotors, magnetos, motor-car dynamos and train-lighting sets, constructional details of armature windings, magnetic cores, frames, commutators, etc., of D. C. machines.

A. C.—Alternators, transformers, synchronous motors, rotary converters, induction motors, A. C. commutator motors, motor converters, rectifiers and phase advancers; starters and controlling devices for different A. C. machines; constructional details of motors, starters, field coils, commutators, slip-rings, etc., of A. C. machines.

**Instruments and Switchgears**—D. C. ammeters, voltmeters, wattmeters, indicating and recording types; integrating meters—amphero-hour meters and wattmeters; A. C. ammeters, voltmeters and wattmeters, indicating and recording types; instrument transformers; power-factor meters; frequency meters; synchroscopes; oscillographs and ondographs; A. C. bridges and potentiometers.

Knife-switches, air-break and oil-immersed circuit-breakers, maximum, minimum and reverse current relays for D. C. and A. C.; protective devices for generating plants and transmission lines; remote control gears and automatic devices.

**Generation and Transmission**—Systems of supply; high and low tension generation; D. C. generating stations and sub-stations; A. C. generating stations and sub-stations; systems of transmission and distribution; D. C.—two-wire and three-wire systems; A. C.—single-phase and polyphase systems; voltage regulation, transmission efficiency; mechanical and electrical considerations of underground and overhead lines; disturbances and protective devices; power-factor correction; typical power plants, including hydro-electric schemes; D. C. turbo-generators, turbo-alternators, etc.

**Electric Traction**—Mechanics of train movement—study of speed-time curves and energy consumption; D. C. traction motors; single-phase and polyphase traction motors; control of



D. C. tramway and railway motors; control of A. C. single-phase and polyphase motors; regenerative breaking; track construction for tramways and railways; overhead construction for tramways and railways; feeding and distributing systems for tramways and railways; sub-stations for tramways and railways.

*Telegraphy and Telephony*—Wireless—laws of oscillating circuits; high frequency oscillations; electromagnetic waves and their application in wireless communication; spark telegraphy and continuous wave telegraphy; thermionic valves and their applications; radio-telephony and broadcasting—long and short wave transmission; transmitters and receivers for telephony, broadcasting stations and receiving sets; construction of transmitters and receiving sets.

*Line Telegraphy and Telephony*—Single and double current working in telegraphy; Morse system—Morse sounder. Syphon recorder and relay. Duplex system—differential and bridge duplex; central battery—omnibus system; Wheatstone automatic system; Hughes's type printing system; Baudot multiple system and printing mechanism.

Manual exchange and automatic telephone; transmitter and receiver—different types; switchboard and appliances at the central exchange, operator's switch keys and telephone set; switchboard lamp signals and cord circuits; protection of telephone apparatus from electrical disturbances; construction of telephone lines and protection from inductive interference, construction and maintenance of Exchanges.

*Practical*—More detailed study on induction motors, alternators, mercury arc rectifiers, rotary converters, synchronous motors, traction motors, commutator motors. Insulation tests, breakdown and minute values, flash over tests on insulators, dielectric loss measurements. A. C. bridge work; harmonic analysis with oscillograph. Meter testing. Electroplating.

### ELECTRICAL ENGINEERING PROJECT

(For Electrical Engineering Candidates only)

*Design I*—Calculations involving the design of D. C. pole magnets, lifting magnets. Output co-efficient of D. C. and A. C. generators and motors, induction motors, induction motor starters. Predetermination of a regulation for alternators and transformers. Detailed study of circle diagrams for induction motors. Predetermination of losses and temperature rise for electrical machinery; calculation of compensating windings and commutator poles.

*Design II*—Design and complete working drawings of D. C. motors and generators; induction motors, transformers, rotary

converters and other A. C. machines; design with complete working drawings and calculations of an electrical engineering project including power stations, sub-stations—switchboards, overhead and underground lines, etc.

Lectures will be given in connection with the above, particular attention being given to Indian conditions. For sessional work at least 3 complete designs in line with above will be required.

## MINING ENGINEERING

*(For Candidates in Mining Engineering only)*

### PART I

Geology applied to mining.

Boring by hand and power machines

Sinking and lining shafts; various methods employed in special cases.

Systems of haulage, underground and above ground; serial ropeways.

Hoisting; head-gear ropes; safety appliances.

*Mining Legislation—*

Methods of working coal; shaft-pillars, preliminary work and various methods of working the seams. Special reference to thick coal working, as practised in England and different parts of the world.

Shot-firing; coal-cutting by machinery.

Surface subsidence and under-sea working.

Timbering and other supports.

Coal-mine plans and sections; connecting surface and underground surveys.

Prospecting for and methods of working mineral veins.

Alluvial mining and open workings.

Hydraulic mining; dredging for gold; ore-beds and deep leads; overhand and underhand stopping. Hand and power; drilling; blasting; timbering.

Metal mine plans.

### PART II

Descriptive mineralogy; physical properties of minerals; description of various ores and fuels; methods of determination.

Prospecting operations.

Drainage of mines; adit levels; pumping machinery; dams; boring against old workings.

Ventilation of mines; natural and artificial ventilation; splitting and regulating air currents; types of fans; water-gauge and anemometer.

Power application in a mine; discussion of relative merits of steam, water, compressed air, electricity and oil as sources of applied power.

Description of gases found in coal mines; colliery explosions, safety lamps; instruments for detecting firedamp; treatment of men overcome by foul air.

Arrangements of surface works at a colliery; sorting and screening coals, coalwashing; briquette making; coking; bye-products.

Surface work of metal mines. Sorting, crushing, sizing, and concentration of various ores. Modern ore dressing machinery, and slime tables.

Special reference to treatment of gold, silver, copper, lead and zinc.

Cyanide and chlorine treatment of slimes.

### DRAWING AND DESIGN

*The Written Test for candidates in Civil Engineering* will be confined to the preparation of detailed drawing from notes and sketches, as applied to Civil Engineering and Architecture: *for candidates in Mechanical, Electrical and Mining Engineering* it will be confined to the preparation of detailed drawings and designs from notes and sketches as applied to machinery and structures relating to these branches.

*Practical Test (for all candidates)*—Attested drawings and designs for Engineering Works and Buildings will be submitted for examination. Marks will be allotted for field work and calculations.

### AERONAUTICS

*(For Candidates in Civil and Mechanical Engineering only)*

#### FIRST-YEAR COURSE

##### (a) Lectures

(1) Fluid Motion—Viscosity, resistance, Reynold's number. (2) Dimensional analysis and dynamical similarity, from model to full-scale. (3) Aerofoil—Angle of Incidence, lift, drag and moment co-efficients, scale effects, aspect ratio, induced and profile drag, introduction to Lanchester Prandtl theory, lift distribution on aerofoil; monoplane and the biplane; lift and weight of a machine. (4) Structural parts—main plane and dihedral angle, body and fuselage, struts and wires, under-carriage. (5) Control—rudder, elevator and wing flaps. (6) Stabilisers—roll, pitch and yaw, tail planes and fins. (7) Approximate Performance Estimation—gliding angle, climb, top speed,

efficient speed and landing speed. (8) Propeller—Froude theory and introduction to aerofoil theory, efficiency. (9) Engines—Aero-engines, hydrodynamic and thermodynamic aspects of carburettors.

### (b) *Laboratory*

The Practical work relates to—

Calibration of float-gauge, Static Plate, Venturi tube, with standard Chattock gauge. Velocity distribution in wind channel and water-oil channel. Pressure measurements on two-dimensional symmetrical bodies. Determination of lift and drag co-efficients.

### (c) *Drawing Office*

Design of simple structural and machine points and connections.

Design of struts, beams and shafts. Load estimation.

Stresses in two- and three dimensional frames.

## SECOND-YEAR COURSE

### (a) *Lectures*

(1) Mathematical theory of two-dimensional fluid motion, conformal representation, vortex motion, aerofoil theory, monoplane and biplane, three-dimensional effects, effect of viscosity, boundary layer theory, Karman vortex.

(2) Air screw theory.

(3) More accurate performance estimation.

(4) Stability in flight, auto-rotation, slotted wings, Bryan on stability.

(5) Vibration and gyroscopic effects of propeller.

(6) Airships, balloons.

(7) Gliders, autogyros, seaplanes, etc.

(8) Materials used in aircraft construction.

(9) Trend of modern aerodynamic research.

### (b) *Laboratory*

Study of flow movements. Experiments on rotating discs, cylinders, spheres, etc., aerofoil sections, models of airships, models of aeroplanes.

### (c) *Drawing Office*

Design of spars, interplane struts, mainplanes, etc. Stresses in fuselage. Secondary stresses.



## GROUP II

Roads and Railways	...	...	400	
Irrigation	...	...	400	
Public Health Engineering	...	...	400	
			—	1,200

## GROUP III

Attested Designs for Engineering Works and Buildings	...	...	500	
Practical Drawings	...	...	300	
Principle of Architectural Design	...	...	200	
			—	1,000
Total Part II				4,000

## MINING ENGINEERING

## Part I

(To be taken at the end of the First-year)

## MATHEMATICS

Theories	...	...	250	
Application	...	...	350	
			—	600

## SCIENCE

Geology and Mineralogy	...	...	200	
Applied Physics (Paper)	...	...	200	
„ „ (Practical)	...	...	150	
Technical Chemistry (Paper)	...	...	200	
„ „ (Practical)	...	...	150	
			—	900
Total Part I				1,500

## Part II

## GROUP I

Applied Mechanics and Hydraulics	...	...	400	
Mining I	...	...	400	
Mining II	...	...	400	
			—	1,200

## GROUP II

Mechanical Engineering (Paper)	...	400	
" " (Laboratory Work)	...	200	
Electrical Engineering (Paper)	...	400	
" " (Laboratory Work)	...	200	
		—	1,200

## GROUP III

Attested Designs for Engineering Works and Buildings	...	500	
Practical Drawing	...	300	
		—	800

Total Part II 3,200

## ELECTRICAL AND MECHANICAL ENGINEERING

## Part I

(To be taken at the end of the First-year)

## MATHEMATICS

Theories	...	250	
Application	...	350	
		—	600

## SCIENCE

Technical Chemistry (Paper)	...	200	
" " (Practical)	...	150	
Applied Physics (Meteorology) (Paper)	...	200	
" " (Practical)	...	150	
		—	700

Total Part I 1,300

## Part II

## MECHANICAL ENGINEERING

## GROUP I

Theory of Machines	...	250	
Heat Engines	...	250	
Hydraulics and Hydraulic Machinery	...	200	
Machine and Engine Design (Paper)	...	200	
		—	900

## GROUP II

Strength and Elasticity of Materials	...	200	
Metallurgy	...	200	
Theory of Structures	...	250	
Structural Design (Paper)	...	250	
		—	900

## GROUP III

Workshop (Sessional Work)	...	250	
and <i>either</i>			
Works Management and Accounts	...	200	
<i>or</i>			
Aeronautics (Paper and Sessional Work)	...	200	
		—	450

## GROUP IV

Mechanical Engineering Laboratories			
(Sessional)	...	200	
Machine and Engine Design (Sessional)	...	400	
Structural Design (Sessional)	...	150	
		—	750

Total Part II 3,000.

## ELECTRICAL ENGINEERING

## GROUP I

Electrical Engineering I	...	200	
Electrical Engineering II	...	200	
Electrical Engineering III	...	200	
Electrical Engineering IV	...	200	
		—	800

## GROUP II

Heat Engines	...	150	
Hydraulics	...	150	
Applied Mathematics	...	150	
Modern Systems of Works			
Management and Accounts	...	150	
		—	600

## GROUP III

Electrical Engineering—Drawing and			
Design (Paper I) (three hours)	...	200	
Electrical Engineering—Drawing and			
Design (Paper II) (six hours)	...	400	
		—	600



## GROUP IV

Mechanical Engineering Laboratory		
(Sessional) ...	200	
Electrical Engineering Laboratory (Sessional)	300	
	<hr/>	500

## GROUP V

Electrical Engineering Design (Sessional) ...	500	
	<hr/>	500
Total Part II		<hr/> 3,000

9. The order of merit on passing the Bachelor of Engineering Examination shall be determined by the marks obtained in Part II only.

10. As soon as possible after the Bachelor of Engineering Examination, the Syndicate shall publish lists, arranged in two classes in order of merit, of those who have passed the Bachelor of Engineering Examination in each Branch under the condition laid down in Rule 5. They shall also publish lists, in alphabetical order, of those who have qualified in either group of Part I, showing also the group in which the candidates may yet have to qualify.

11. The pass marks for each Section of the B.E. Examination shall be one-third in each group of subjects and half of the aggregate. In order to be placed in the First Class a candidate must obtain two-thirds of the marks in Part II. The candidate who is placed first in the First Class in each Branch shall receive a gold medal and a prize of books to the value of Rs. 200

12. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 60 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

13. If the Examiners are of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate.

## CHAPTER LII-A

### BACHELOR OF METALLURGY

1. An examination for the Degree of Bachelor of Metallurgy will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. The course for this examination shall last for three years and the examination shall be divided into three Sections—Section A, Section B and the Final Examination.

Any under-graduate of the University may be admitted to this examination provided he has prosecuted a regular course of study in a college affiliated to the University to the B.Met. standard for three academical years after passing the Intermediate Examination in Science with Chemistry, Physics and Mathematics, or for two academical years after passing the Bachelor of Science Examination with Chemistry, Physics and Mathematics in which case he shall be exempted from Section A Examination.

3. Syllabuses of studies, the rules regarding distribution of marks and pass marks, and the rules for admission and fee in respect of the Section A Examination shall be identical with those as laid down for Section A of the Intermediate Examination in Engineering (Chap. LI).

4. The subjects for the Section B and the Final Examinations shall be grouped and marks distributed as follows:—

#### SECTION B EXAMINATION

(To be taken at the end of the Second-year)

##### GROUP I

Mechanical Engineering including theories of steam and internal combustion engines and strength of materials ( <i>Theoretical</i> )	...	300
Mechanical Engineering ( <i>Laboratory and Sessional</i> ) including mechanical testing of metals	...	200
Electrical Engineering ( <i>Theoretical</i> )	...	300
Electrical Engineering ( <i>Laboratory and Sessional</i> )		200
Drawing ( <i>Theoretical</i> )	...	300
Drawing ( <i>Practical and Sessional</i> )	...	200
		— 1,500

## GROUP II

Physical Chemistry ( <i>Theoretical</i> )	...	200	
Physical Chemistry ( <i>Practical</i> )	...	100	
Geology and Mineralogy ( <i>Theoretical</i> )	...	200	
Geology and Mineralogy ( <i>Practical</i> )	...	100	
Dressing of Minerals, and Refractory Materials	...	300	
		<hr/>	900

## GROUP III

Fuels	...	200	
General Metallurgy and Iron-Founding	...	400	
General Metallurgy and Iron-Founding	...	200	
Chemical Analysis and Calorimetry ( <i>Practical</i> )	...	400	
		<hr/>	1,200

## FINAL EXAMINATION

(To be taken at the end of the Third-year)

## GROUP I

Metallurgy of Iron and Steel	...	600	
Furnace Design and Drawing —			
Sessional	...	300	
Practical	..	300	
		<hr/>	1,200

## GROUP II

Metallurgy of Non-Ferrous Metals	...	400	
Electro-Metallurgy	...	200	
Metallurgical Analysis and Assaying ( <i>Theoretical</i> )		200	
Metallurgical Analysis and Assaying ( <i>Practical</i> )	...	400	
		<hr/>	1,200

## GROUP III

Metallography, Heat Treatment and Pyrometry			
( <i>Theoretical</i> )	...	400	
Metallography, Heat Treatment and Pyrometry			
( <i>Practical</i> )	...	300	
Metallography, Heat Treatment and Pyrometry			
( <i>Sessional</i> )	...	300	
Mechanical Working and Testing of Metals	...	200	
		<hr/>	1,200

5. The limits of the subjects shall be as follows :—

### Section B Examination

#### GROUP I

The syllabuses of all the subjects in this Group are identical with those of the corresponding subjects for I.E. Section B Examination (Chap. LI) excluding the Syllabus in Civil Engineering Drawing from "Drawing" at the I.E. Section B Examination.

#### GROUP II

#### PHYSICAL CHEMISTRY

##### *Theoretical*

Properties of gases and liquids; Avogadro's hypothesis; Kinetic theory; Properties and laws of solutions; Law of mass action; Chemical equilibrium in homogeneous systems; Phase rule; Equilibrium in heterogeneous systems; Colloids; Velocity of reactions; Catalysis; Theory of electrolytic dissociation and its applications; Law of conservation of energy; Thermo-Chemistry; Second law of thermodynamics and its application to chemical reactions; Clausius-Claypeyron equation; Joule-Thomson effect; Relation between chemical and electrical energy; Origin of E. M. F. in primary, secondary and concentration cells; Theory of electrolytic corrosion; Principles of electro-analysis and electrometric titrations; Thermo-dynamical study of technical gas reactions.

##### *Practical*

Molecular weight determination by Victor Meyer's vapour density method; Molecular weight determination by freezing point method; Distribution of a solute between two non-miscible solvents; Investigation of homogeneous equilibrium—Hydrolysis of methyl acetate; Conductivity of electrolytes—determination of cell constant; Preparation of Standard half elements and determination of decomposition potential of salts; Electrometric titrations by oxidation—reduction methods; Electrometric titrations by precipitation method; Determination of hydrogen on concentration and acid alkali titration; Calorimetry and the use of bomb calorimeter; Determination of transition temperature of salts and alloys by dilatometer.

## GEOLOGY AND MINERALOGY

*Theoretical*

**Physical Geology**—A general view of the earth. Denudation by the weather, rivers, glaciers and the sea; transportation and deposition of detritus: consolidation of detritus: lamination and stratification. Volcanoes and volcanic products. Mode of occurrence of igneous rocks: dyke, sill, neck, laccolith, phacolith, stock, batholith. Results of earth movements: formation of basins, domes, folding, over-folding: dip, strike, outcrop; normal and reversed faults. Rock cleavage, joints, metamorphism; thermal, dynamic and regional metamorphism.

**Petrology**—Classification, character and essential constituents of the more important igneous rocks.

**Sedimentary rocks**—Characteristics; Mode of origin and classification; General description of different sedimentary rocks.

**Metamorphic rocks**—Characteristic structures. General description of commoner kinds of metamorphic rocks.

**Palaeontology**—Fossils, their mode of preservation: rocks in which they occur. Importance of fossils in stratigraphical geology.

**Stratigraphical Geology**—Leading principles of stratigraphy. A general outline of Indian stratigraphy.

**Crystallography**—Symmetry: Crystallographic axes; Indices; Systems and Forms; Reading and drawing of crystals.

**Mineralogy**—Physical properties of minerals in general. Description of following mineral species:—

Native Elements—Diamond, Graphite, Gold.

Ore Minerals—

Aluminium—Bauxite.

Antimony—Stibnite.

Chromium—Chromite.

Copper—Chalcopyrite, Bornite, Chalcocite, Cuprite, Malachite, Azurite.

Iron—Magnetite, Hematite, Limonite, Siderite.

Lead—Galena, Cerussite.

Magnesium—Magnesite.

Manganese—Psilomelane, Braunite, Pyrolusite.

Mercury—Cinnabar.

Nickel—Pentlandite, Garnierite, Niccolite, Nickeliferous pyrrhotite.

Silver—Argentite, Pyrargyrite, Proustite.

Sulphur—Pyrites.

Tin—Cassiterite.

Tungsten—Wolframite, Scheelite.

Zinc—Sphalerite, Smithsonite.

Refractory Minerals—Quartz, Kaolinite, Magnesite, Chromite, Graphite, Bauxite, Silimanite, Kyanite.

Oxide—Quartz, Corundum.

Carbonates—Calcite, Dolomite, Magnesite.

Sulphates—Gypsum, Barytes.

Phosphate—Apatite.

Silicates—Feldspar group, Feldspathoid group, Pyroxene group, Amphibole group, Olivine, Muscovite, Biotite, Talc, Serpentine.

Halides—Fluorite, Cryolite.

Economic Geology—Form of mineral deposits. Origin and classification of mineral deposits: Enrichment of ore deposits: Coal, petroleum, clay, and economic mineral deposits of India.

### *Practical*

Determination of physical properties of minerals. Identification in the laboratory of minerals studied during lectures. Demonstration of methods of ore microscopy and preparation of polished sections of ore minerals. Megascopic determination of rocks.

### DRESSING OF MINERALS

Purpose and advantage of separating gangue material from valuable minerals and one mineral from another. Properties made use of in separation. Concentration by hand picking and sorting. Breaking, crushing and grinding mills. Sizing, classification. Water concentration. Flotation concentration. Magnetic, electrostatic, pneumatic and centrifugal separation. Percentage recovery, ratio of concentration and enrichment. Flow-sheets.

### REFRACTORY MATERIALS

Acid, basic and neutral refractories. Physico-chemical properties that enable them to resist erosion, high temperature, changes of temperature and action of molten metal and slag. Study of expansion, contraction, specific heat, porosity, permeability, thermal and electric conductivity of refractories. The preparation of refractory materials and their uses in the manufactures of fire-bricks, crucibles, retorts and for lining furnaces.

### GROUP III

#### FUELS

The chemical composition, calorific power and general uses of fuels. Combustion. Calculation of volumes and weights of

air necessary for combustion of fuels. Calculation of heat losses. Conditions necessary to ensure heat efficiency of furnaces.

Solid fuels—Wood and charcoal. Coal, its origin, nature and classification. Characteristics and distribution of Indian coals. Destructive distillation of coal at high and low temperatures. Manufacture of Metallurgical Coke and recovery of by-products.

Pulverised coal and coal briquettes.

Liquid fuels—Petroleum and their distillation products. Coal tars and their distillation products. Shale oil. Products of hydrogenation of coal.

Gaseous fuels—Producer gas, semi-producer gas, water gas, Mond gas, blast furnace gas. Their manufacture, composition and calorific values. The chemical reactions and thermal changes involved in gas production.

Calorimetry—Types of calorimeters for estimating the calorific values of solid, liquid and gaseous fuels. The bomb calorimeter.

#### GENERAL METALLURGY AND IRON-FOUNDING

A brief history of the metallurgical art.

The nature, objects, and classification of metallurgical processes. The definition of metallurgical terms and of the chief physical and mechanical properties of metals. Occurrence and distribution of principal ores and the limits of their composition. Roasting and calcining of ores. Various types of metallurgical furnaces. Selection of fuel. Methods for regulating and pre-heating air supply. The recovery and utilization of waste heat. Characteristics and composition of slags and fluxes.

Brief outline of the principal processes for extraction of gold, copper, zinc, lead, tin and iron. The methods of making brasses, bronzes, type and antifriction metals. Their properties and uses.

Iron-founding—Pig iron. Influence of various constituents on the properties of pig iron. Grading of pig iron. The foundry cupola. Melting of pig iron in cupola and reverberatory furnaces. Changes in composition produced by re-melting of pig iron. The phenomena of crystallization, segregation and shrinkage during solidification of iron. Moulding sands and their properties. Green-sand, dry-sand, and loam moulding. Chilled and malleable castings.

#### PATTERN-MAKING AND FOUNDRY

Practical details of pattern-making.

Making of patterns of machine details. Making of simple core boxes. Practical details of moulding. Making of moulds

from patterns. Charging of the cupola. Practical details of casting ferrous and non-ferrous metals and alloys. The Practical work will be done in the Pattern Shop and Foundry.

## CHEMICAL ANALYSIS AND CALORIMETRY

### *Practical*

The determination of iron, copper, lead, tin, zinc, nickel, manganese, chromium, antimony, arsenic, silver, chloride, sulphate, phosphate and carbonate by wet methods.

The analysis of coal, coke and furnace gases.

The determination of calorific value of solid and liquid fuels.

## Final Examination

### GROUP I

#### METALLURGY OF IRON AND STEEL

Occurrence and distribution of iron ores. Iron ores of India. Preparation of iron ores. The blast furnace and its accessories. Smelting of iron ore in the blast furnace. Chemistry of smelting. Calculation of blast furnace charge. The advantage and necessity of pre-heating air blast. The evil effect of too much moisture in blast. Effect of furnace charges and conditions of working on the composition of pig iron. Blast furnace products. Composition and grading of pig iron. Influence of different constituents on the properties of pig iron. Manufacture of spiegeleisen, ferro-manganese and ferro-silicon in the blast furnace. Foundry cupola. Chilled and malleable castings. Methods of manufacture, properties and uses of wrought iron.

Production of tool steels by cementation and crucible processes. Grading of tool steel. Manufacture of steel by Bessemer, open hearth, modified open-hearth, duplex and electric processes. Chemistry (including thermo-chemistry) of the processes of steel making. Comparative study of the various steel-making processes. Considerations to be taken into account in the selection of a process. Manufacture of iron and steel in ancient India. Methods of making alloy steels. The steel foundry and steel castings. Influence of carbon and other elements on iron. Case-hardening of steel. Welding. Corrosion and methods of protecting iron from corrosion, including galvanizing, tinning, etc.

*(N.B.—In the treatment of this subject the methods that are in operation in India will be dealt with more fully.)*



## FURNACE DESIGN AND DRAWING (SESSIONAL)

Students shall make about six drawings of various types of furnaces and shall make various calculations in connection with smelting of metals, manufacture of coke, producer gas, etc.

## GROUP II

## METALLURGY OF NON-FERROUS METALS

Gold—The ores of gold. Preliminary treatment and processes of extraction. Parting of gold and silver. Refining. Alloys of gold. Standard gold.

Silver—The ores of silver. Preliminary treatment and extraction. Cupellation. Refining. Alloys of silver. Standard silver.

Copper—The ores of copper. Smelting in reverberatory and blast furnaces. Pyritic smelting. Calculation of furnace charge. Constitution of copper matte. Bessemerizing of copper matte in different types of converters. Wet method of extraction. Furnace and electrolytic refining of copper. Chief alloys of copper.

Nickel—The ores of nickel. Methods of extraction and refining. Grain, cast and malleable nickel. Chief alloys of nickel.

Lead—The ores of lead and their smelting. Softening of hard lead. The Pattinson and Parkes processes of desilverization of lead. The chief alloys of lead.

Tin—Dressing and separation of tin ores from wolfrum, etc. The smelting of tin ores and refining of tin. The alloys of tin.

Zinc—The ores. Extraction and refining of zinc. Chief alloys of zinc.

Antimony—Smelting of antimony ores and refining of the metal. Alloys of antimony.

Elementary treatment of the metallurgy of cadmium, mercury, chromium, tungsten and platinum.

The chief physical, mechanical and chemical properties as well as the uses of the above metals.

*(N.B.—In the lectures on this subject the methods that are in operation in India will be treated more fully.)*

## ELECTRO-METALLURGY

Extraction on refining of the following metals by electrolytic method :—

Sodium, potassium, calcium, magnesium, aluminium, copper, zinc, iron, nickel, lead, gold and silver. Principles of elec-

troplating. The electro-thermal process of reducing iron from its ores. Various types of electric furnaces used in metal industry. Processes of making steel and ferro-alloys in electric furnaces. Power factor, load factor, regulators, electrodes, economizers, electrical connections and control. Electric welding.

## METALLURGICAL ANALYSIS AND ASSAYING

### *Theoretical*

The necessity and importance of securing a representative sample for analysis. Conditions on which this depends. Hand sampling and mechanical sampling. Common methods of sampling coal, ores, metals, etc.

Lectures will be given to explain the principles underlying the analyses and assays prescribed for the Practical course.

### *Practical*

The fire assay of the ores of gold, silver, lead and tin, and gold and silver bullion. Making of common non-ferrous alloys in crucible furnace in the laboratory and their analysis. The complete analysis of refractories in the ferrous and non-ferrous alloys, ores, mattes, slags and other metallurgical products.

## GROUP III

### METALLOGRAPHY, HEAT TREATMENT AND PYROMETRY

#### *Theoretical*

Crystalline structure of metals. Relationship of structure to composition and properties. Crystallization of metals and alloys. Heating and cooling curves. Thermal equilibria in metallic systems illustrated by reference to equilibrium diagrams. The Phase Rule and its application to metallic systems.

The grinding, polishing and etching of metallic sections. The optics of metallographic microscope. Importance of both thermal and microscopic methods in the study of metallic systems. Chief characteristics of the micro-structures of metals and alloys. The phenomenon of under cooling. The metastable and labile states. Delayed crystallization. Examples. Effects of direct and alternating stresses, within or beyond the elastic limit, on metals and their structures.

The iron-carbon equilibrium. The nature and physical properties of Austenite, cementite, delta, gamma, beta, and alpha

iron. The critical points and phase changes in solid alloys containing from 0 to 1.8 per cent. carbon. The  $A_1$ ,  $A_2$ ,  $A_3$ ,  $A_4$ , and  $A_5$  points.

Crystallization of pure iron and iron carbon alloys. Formation of dendritic Austenite, granulation and secondary crystallization. Characteristics of pearlite. Stages intermediate between Austenite and Pearlite, *viz.*, Martensite. Troostite and Sorbite. Micro-structure of alloy steels. Micro-constituents of cast iron.

Hardening of metals and alloys considered generally. Heat treatment of steel. Effect of heat-treatment on the structures and properties of steel.

Equilibria in the principal non-ferrous systems, *viz.*, lead-antimony, lead-tin, tin-antimony, aluminium-silicon, aluminium-magnesium, aluminium-zinc, zinc-copper, copper-tin, copper-aluminium and copper-silver.

Pyrometry—Air thermometer, thermo-electric couples, the electric resistance thermometer, radiation and optical pyrometers. Seger cones. The calibration of pyrometers. Determination of freezing and melting points, and phase changes in the solid condition. Methods of plotting curves.

### *Practical*

Standardization of pyrometers. The thermo-electric method of determination of freezing point curves and critical points in the solid state by means of potentiometer. Types of industrial pyrometers and their use. Microscopic examination of metallic sections. The preparation of micro-sections. The use of microscope in the examination of metals and alloys. Systematic examination of the micro-structures of metals including pure metals, wrought iron, steels, alloy steels, cast irons, brasses, bronzes, anti-friction metals, zinc-aluminium alloys and other important industrial alloys. Photo-micrography.

The effect of rate of cooling, normalizing, annealing, quenching, tempering and presence of inclusions on the micro-structure and mechanical properties of metals and alloys.

### MECHANICAL WORKING AND TESTING

Defects of cast metal. The need for mechanical working. The flow of metals. Effects of composition and impurities. Cold and hot working. Cold and red shortness. Temperature of working.

Various methods of working metals, *viz.*, rolling, forging by hammer and press, drop-forging, stamping, extrusion, etc.

Mechanical properties of metals and how they are tested.

Typical standard specifications of important industrial metals and alloys.

Inspection of defects and flaws in metals.

6. Every candidate for admission to the Section B Examination shall send to the Registrar his application, with a certificate in the form prescribed by the Syndicate together with a fee of Rs. 40, at least fourteen days before the date fixed for the commencement of the examination.

A similar rule shall be observed in regard to the registration of a candidate's name for the Final Examination, in which case the fee shall amount to Rs. 50, irrespective of whether the candidate has previously passed or failed in the Section B Examination. A candidate who fails to pass or present himself for either examination shall not be entitled to a refund of the fee.

A candidate may be admitted to one or more of the subsequent examinations on payment of fee of like amount to those above noted.

7. A candidate may be permitted to present himself for the Section B Examination at the end of the Second-year course provided he has already qualified in Section A Examination. In the event of his failing in one group only and/or in the aggregate in the Section B Examination he may be allowed to present himself again for examination in that group in which he failed; or in any one group to be chosen by him in the case of his failing in the aggregate at the end of the Third-year course. Such a candidate may obtain credit for the remaining groups of the examination. If, however, a candidate fails in more than one group of the examination he will have to present himself for re-examination in all the groups of Section B Examination.

8. A candidate may be permitted to present himself for the Final Examination at the end of the Third-year course and if he fails in one group and/or in the aggregate he will have to appear again in all the groups at a subsequent examination.

No candidate shall be allowed to pass the Final Examination unless he has previously passed in Section B Examination.

9. The pass marks for Section B and the Final Examinations shall be one-third in each group of the subjects and forty per cent. of the aggregate in each section. A passed candidate who secures a minimum of fifty-five per cent. and two-thirds of the combined full marks of both Section B and the Final, shall be declared to have passed in the Second and First Classes, respectively. The candidate who is placed first in the First Class shall receive a gold medal and a prize of books to the value of Rs. 200.

10. Any candidate who has failed in one group of subjects only and by not more than five per cent. of the full marks in that group, but has shown merit by gaining sixty per cent. or more in the aggregate of the marks of that Section, shall be allowed to pass.

11. If the Board of Examiners are of opinion that in the case of any candidate not covered by the preceding Regulations consideration ought to be allowed by reason of his high proficiency in a particular group or in the aggregate, they shall report the case to the Syndicate and the Syndicate may pass such candidate.

12. The order of merit on passing the Examination for the Degree of Bachelor of Metallurgy shall be determined by the combined total marks obtained in both Sections.

13. As soon as possible after the examination the Syndicate shall publish lists in order of merit of those who have passed the Final Examination in the Second and First Classes. They shall also publish lists in alphabetical order of other candidates who have passed the Final Examination and of those who have qualified in two groups of Section B, showing also the group in which the candidates will yet have to qualify. Each successful candidate shall receive with his Degree of B.Met. a certificate in the form entered in Appendix A.

## CHAPTER LII-B

### INTERMEDIATE EXAMINATION IN ARCHITECTURE

1. The Intermediate Examination in Architecture will be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination, provided he has prosecuted a regular course of study in a college affiliated to the University in Architecture for two academical years after passing the Intermediate Examination in Arts or in Science, or for one academical year after passing the B.Sc. Examination in Mathematics, Physics and Chemistry or Geology, or in Mathematics, Chemistry, and Physics or Geology, in which case he shall be excused from appearing in those subjects at Section A of the Intermediate Examination in Architecture in which he appeared at his B.Sc. Examination, but he shall not be declared to have passed in Section B until he has qualified himself in the remaining subject of Section A.

3. The Intermediate Examination in Architecture shall be divided into two Sections—A and B, the limits of which are set down in the syllabus. Section A may be taken at the end of the first year of the Intermediate Course and in the event of a candidate failing in one group, Mathematics or Drawing or Science, he may be allowed to present himself for re-examination in that group when appearing at the Intermediate Examination in Architecture, provided that a candidate securing pass marks in each group but failing in the aggregate may be allowed to present himself for re-examination in one or more groups, when appearing at the examination. Such a candidate may obtain credit for the remaining group or groups, as the case may be, of Section A, but he shall not be allowed to pass in Section B unless he has previously passed in Section A.

4. Every candidate for admission to the examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate and a fee of Rs. 25 for Section A or Rs. 40 for the Intermediate Examination in Architecture (whether he has previously passed in Section A or not), fourteen days before the date fixed for the commencement of the examination. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of a like fee of the amount herein prescribed in each occasion.

5. Every candidate shall be examined in the following subjects :—

Section A.—Mathematics, Drawing and Science.

Section B.—Architectural Theory, Architectural Design, Electrical Engineering, Construction and Surveying.

6. The limits of the subjects shall be as follows :—

### Section A

#### MATHEMATICS

Computation and Mensuration—

(a) Approximate and abbreviated methods of performing numerical calculations.

Theory of Logarithms. Use of Logarithmic tables. Application of Logarithms to Arithmetical and Trigonometrical calculations including the solution of triangles and the determination of heights and distances. Proof of the formulæ used.

(b) Mensuration of plane and solid figures, including the areas of plane polygons in Cartesian and polar co-ordinates, and the application of Simpson's rules, the prismoidal formulæ and Guldin's theorems. Proof of the formulæ used.

Statics—

Composition of concurrent and parallel forces acting on a rigid body, centre of parallel forces; centres of mass; reduction of any system of co-planer forces acting on a rigid body to a single resultant force and couple and to a single resultant force or couple. Conditions of equilibrium; statically equivalent system of forces; problems on equilibrium. Friction. Machines.

Differential and Integral Calculus—

Graphs: gradient: function: limits. Derivative of a power: Geometrical applications. Second differential: maximum and minimum. Meaning of Integration. Integration of powers. Integration by change of variable. Areas. Volumes. Differentiation and Integration of simple trigonometrical functions. Centres of Gravity. Moments of inertia.

#### DRAWING

Freehand and Geometrical Drawing:—

(a) Life drawing.. Use of pencil, Charcoal, etc.

(b) Freehand drawing of Geometric and Sculptured forms.

- (c) Measured drawings of Architectural details, furniture, iron work, etc.
- (d) Geometric, Isometric, Axonometric, Perspective drawings, Shadow Projection, Rendering in monochrome ink, etc.
- (e) Colour and decoration and the application of washes.

## SCIENCE (PHYSICS AND CHEMISTRY)

### PHYSICS

#### *Theoretical*

Units of measurement; density; gravitation; Hook's Law. Nature, propagation and reflection of sound. Resonance. Acoustics of buildings.

Thermometry expansion; Boyle's and Charles's laws; fusion; evaporation; heat and work. Propagation, reflection and refraction of light; microscopes and telescopes; colour; illumination.

Properties of magnets; magnetic induction; Earth magnetism. Elementary principles of Statical Electricity. Properties of electric current; cell; Ohm's law; electromagnetic induction. Electric lamps, bell, telephone and microphone.

#### *Practical*

Simple exercises on—Vernier, screw-gauge, balance, spirit level, sonometer, thermometers, mirrors, lenses, telescope, microscope, compass, magnetometer, cells and batteries, galvanometer, ammeter and voltmeter.

### CHEMISTRY

#### *Theoretical*

Physical and Chemical changes; elements and compounds; laws of chemical combination; Dalton's atomic theory; equivalent, atomic and molecular weights; valency; Avogadro's hypothesis; chemical symbols, formulas and equations, the gas laws; diffusion; dissociation; distillation; solution; colloidal solution; acids; bases and salts; electrolysis; electrolytic dissociation.

Studies of the principal elements and their chief compounds.

Composition, preparation and properties of natural and prepared mineral pigments; of limes, cements and plaster; of coal; coal gas, producer gas and water gas.

Chemistry of combustion, formation of smoke and water-softening processes.



### *Practical*

Qualitative experiments on elementary substances, compounds and mixtures; on air and water; on the preparation of hydrogen, oxygen, nitrogen and chlorine; on the action of heat, water and acids on a few common substances; on the recognition by practical tests of mercury, lead, copper, arsenic, antimony, tin, iron, aluminium, chromium, zinc, manganese, calcium, strontium, barium, magnesium, sodium, potassium and ammonium compounds present in a mixture containing not more than two of these metals.

## **Section B**

### ARCHITECTURAL THEORY

#### Architectural Order Composition—

Composition to be undertaken individually by the students, of details of—

Greek, Roman or Renaissance orders with appropriate ornaments, etc., of the style.

#### Applied Mechanics—

Definition of terms, Structure, Stress, Strain, Working load. Factor of safety, Fatigue, Elasticity; Bending moments, Moment of resistance, Cantilevers, Beams supported at two points; Moments of inertia, Shearing stress, Deflection. Timber and Iron beams and Roofs. Foundations.

#### History of Architecture—

Egyptian architecture. Assyrian and Babylonian architecture, Grecian, Etruscan and Roman, Byzantine and Saracenic. Early Indian. Romanesque, Gothic, Early Renaissance (up to the middle of the 17th century).

### ARCHITECTURAL DESIGN

1. Lectures on the Theory of Architecture, *i.e.*, Evolution of the plan of—

- (a) The Domestic House.
- (b) Public and Office buildings, Banks, Libraries and Museums, etc.
- (c) Theatres, Restaurants, Cinemas and Hotels.
- (d) Shops and Warehouse Planning.
- (e) School and Hospital Planning, etc.
- (f) Elementary Town Planning and Civic design.

2. Applied problems of design to be undertaken individually by each student, *e.g.*, designs for a small house, layout of a park, an interior decoration subject.

### 3. Earthquake-proof Structure—

Values of Seismic force for different localities.

Different types of monolithic construction to suit climatic and local conditions.

Effect on the structure due to nature of soil, depth of foundation and to the height and weight of the structure.

Frame-work of the structure, reinforced concrete, brick or steel with their merits and demerits. Different types of panel fittings, their heat, insulation properties and relative costs.

Nature of suitable roofs.

Articulation joints for massive buildings.

Small isolated buildings requiring no frame-work.

## ELECTRICAL ENGINEERING ...

### *Theoretical*

Mechanical, thermal and electrical units. Simple laws of electrical circuits. Electro-magnetic forces and induction of E.M.F.: magnetic properties of iron and steel. D. C. motors and generators—E.M.F. equations for different types of windings; shunt, series and compound wound Machines. Broad principles involving commutation and armature reaction. Simple characteristics of D. C. machines. Secondary cells. Simple problems on D. C. distribution. I.E.E. tables for wires and cables. Alternating currents—Production of A.C.E.M.F.; wave diagrams for A.C.E.M.F., current and power R.M.S. value, average value and form factor. Phase displacements and vectorial representation of alternating quantities. Effect of resistance—inductance and capacitance. Simple, series and parallel circuits. Power and power factor of simple A.C. circuits.

### *Practical*

Measurement of low and high resistances: calibration of ammeters and voltmeters; variation of lamp resistances with current; different uses of milli-voltmeters and milli-ammeters; fault localisation of electrical machines; uses of megger; practical house wiring diagrams; resistance measurement by 'drop method.' No-load characteristics of shunt, series and compound wound generators and motors. No-load characteristics of separately excited motors and generators.

## MATERIALS OF CONSTRUCTION

Structure, classification and characteristic qualities of building stones, quarrying and blasting preparation of bricks and tiles, cementing materials, plasters, paints and varnishes, timber, iron and steel, lead, copper and zinc and the common alloys.

## DETAILS OF CONSTRUCTION

Brick and stone masonry, earth-work, carpentry, foundations, walls, floors and roofs of buildings. Arches, construction of masonry, wooden and iron bridges, construction and maintenance of roads.

## ESTIMATING

(a) The estimating and preparation of indents for materials of simple buildings, culverts; earthwork; roads and structural work.

(b) Weights and costs.

## SURVEYING

Prismatic Compass, Level, Theodolite and Plane Table. Topographical surveying of limited areas. Practice of levelling, Route surveying and laying out curves. (Attested surveys executed by the candidate will be submitted to the Examiner, to which marks will be assigned.)

7. There shall be 4 papers and one practical test in Section A, and 9 papers and two practical tests in Section B.

The subjects and marks shall be distributed as follows:—

## SECTION A

(To be taken at the end of the First-year)

## GROUP I

*Mathematics*

1. Computation, Mensuration and Statics	...	300	
2. Differential and Integral Calculus	...	300	
		<hr/>	600

## GROUP II

3. Freehand and Geometrical Drawing	...	400
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## GROUP III

## 4. Science (Physics and Chemistry)—

Theory	...	...	...	300	
Practical	...	...	...	200	
				<hr/>	500

Total Section A ... 1,500

## SECTION B

(To be taken at the end of the Second-year)

## GROUP I

*Architectural Theory*

5. Architectural Order Composition	...	400	
6. Applied Mechanics	...	400	
7. History of Architecture	...	500	
		<hr/>	1,300

## GROUP II

*Electrical Engineering and Architectural Design*

8. Architectural Design	...	600	
9. Electrical Engineering—			
Theory	...	200	
Laboratory	...	100	
		<hr/>	900

## GROUP III

*Construction*

10. Materials of Construction	...	200	
11. Details of Construction	...	500	
		<hr/>	700

## GROUP IV

*Surveying*

12. Estimating	...	200	
13. Surveying—			
Theory	...	300	
Practical	...	200	
		<hr/>	700

Total Section B ... 3,600

8. The order of merit on passing the Intermediate Examination in Architecture shall be determined only by the marks obtained by the candidates in Section B.

9. As soon as possible after the Intermediate Examination in Architecture the Syndicate shall publish lists in order of merit of those who have passed the Intermediate Examination in Architecture under the conditions laid down in Section 3. They shall also publish lists in alphabetical order showing the candidates who have qualified in any two groups of Section A and declaring the group in which a candidate may again have to present himself.

10. The pass marks of each section of the Intermediate Examination in Architecture shall be one-third in each group of subjects and half of the aggregate.

11. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject, and has shown merit by gaining 60 per cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

12. If the Examiners are of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject, or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate.

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## CHAPTER LII-C

### BACHELOR OF ARCHITECTURE

1. The examination for the degree of Bachelor of Architecture shall be held annually at such time and place as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any under-graduate of the University may be admitted to this examination provided he has prosecuted the regular course of study in a college affiliated to the standard of Bachelor of Architecture Examination for two academical years after passing the Intermediate Examination in Architecture.

3. The Bachelor of Architecture Examination shall be divided into two Sections, A and B, according to the limits laid down in Section 6.

#### SECTION A

Theory of Architecture.

Applied Mechanics and Reinforced Concrete.

Hygiene and Sanitation.

#### SECTION B

Theory of Building Construction, etc.

Theory of Architecture.

Architectural Design.

A candidate may be permitted to present himself for Section A at the end of the first year of the Bachelor of Architecture course, and in the event of a candidate failing in one group, he may be allowed to present himself for examination in that group at the Bachelor of Architecture Examination, provided that a candidate securing pass marks in each group but failing in the aggregate may be allowed to present himself for re-examination in one or more groups when appearing at the examination. Such a candidate may obtain credit for the remaining group, if any, of Section A, but he shall not be allowed to pass in Section B unless he has previously passed in Section A.

4. Every candidate for admission to Section A and Section B Examination shall send to the Registrar his application with a certificate in the form prescribed by the Syndicate together with a fee of Rs. 30 at least 14 days before the date fixed for the commencement of the examination.

A similar rule shall be observed in regard to the registration of a candidate's name for the Bachelor of Architecture Examination, in which case the fee shall amount to Rs. 50 irrespective

of whether the candidate has previously passed or failed in the subjects of **Section A**.

A candidate who fails to pass or present himself for either examination shall not be entitled to a refund of the fee.

A candidate may be admitted to one or more subsequent examinations on payment of a fee of like amount to those noted above.

5. Every candidate shall be examined in Building Construction, Lighting and Heating, Hygiene and Sanitation, Professional Practice, History of Indian Architecture, and Iconography, Indian Order Composition, Architectural Design, Applied Mechanics, Reinforced Concrete and Modelling.

6. The limits of the subjects shall be as follows:—

### **Section A**

#### **HISTORY OF INDIAN ARCHITECTURE AND ICONOGRAPHY**

(a) Outline of Ancient Indian History and Culture dealing specifically with

- (i) Prehistoric period.
- (ii) Ancient period.

(b) History and development of Indian Architecture.

#### **INDIAN ORDER COMPOSITION**

Lectures on orders to include—

- (a) Buddhistic Order.
- (b) Brahmanical Order (Pre-Gupta).
- (c) Gupta Order.
- (d) Chalukya Order.
- (e) Dravidian Order.

and a composition of these orders.

#### **MODELLING**

Clay and Cardboard modelling.

Card modelling of subjects that have previously been designed by the students.

#### **REINFORCED CONCRETE**

Definition of Reinforced Concrete.

Short history of Reinforced Concrete development.

Specification of Reinforced Concrete Materials.

Proportioning and Mixing.

Tests.

Stresses in Concrete.

Present-day uses.

Design of columns, roofs, floorslabs and beams.

Design of shearing blocks.

Illustrative examples of the above.

### APPLIED MECHANICS

Definitions. Elasticity. Tension. Compression. Shearing. Transverse strain. Statics of structures. Roof trusses. Deflection of beams. Masonry arches and domes. Stability and Resistance of Abutments and Piers.

### HYGIENE AND SANITATION

Principles of site selection (rainfall, altitude, conditions of soil), Ventilation, Smoke abatement.

Water Supply, Central Storage, House Storage and Treatment.

Drainage and Testing, Disposal of House Sewage, Septic Tanks, Cess Pools, Internal House Plumbing and Sanitary equipment.

## Section B

### BUILDING CONSTRUCTION

*(Syllabus to be taught in the 3rd- and 4th- years. Examination to be taken at the end of the 4th-year.)*

Foundations. External Walls. Internal Walls and Partitions. Fireplaces and Chimneys. Roofs. Floors. Windows, Doors and Staircases.

Plumbing and Sanitary fittings.

Electric and Heating Installations.

Detailed working drawings of the above.

### LIGHTING AND HEATING

- (a) Window areas and domestic lighting.
- (b) Lighting of factories, schools, shops and offices.
- (c) Lighting of art galleries, cinemas and theatres.
- (d) Concealed and flood lighting.
- (e) Neon and daylight illumination.
- (f) Street lighting.
- (g) Oil, gas and electric lighting systems.
- (h) Central Heating equipment.



- (i) Panel Heating equipment.
- (j) Cold Storage and Refrigeration.
- (k) Air Conditioning.

### PROFESSIONAL PRACTICE

- (a) Code of Professional Conduct and Procedure.
- (b) Specifications.
- (c) Contracts and liabilities.
- (d) Submission of Plans to Public authorities.
- (e) Professional charges.
- (f) Litigation and arbitration.
- (g) Easements of light and air. Ancient lights. Zoning.
- (h) Dilapidations.
- (i) Party-wall notices.
- (j) Bye-Laws. Building and Town Planning Acts. Municipal Acts.

### HISTORY OF INDIAN ARCHITECTURE AND ICONOGRAPHY (IV-YEAR)

- (a) Outline of Ancient Indian History and Culture dealing specifically with—
  - (i) Gupta Period (320 A.D. to 647 A.D.)
  - (ii) Post-Gupta Period (7th to 10th Century A.D.)
  - (iii) Mediaeval Period (including Early Muhammadan—10th to 16th Century A.D.).
  - (iv) Moghul Period (16th to 17th Century A.D.).
- (b) History of Indian Fine Arts (Crafts, Sculpture and Painting).
- (c) History of Indian Iconography.
- (d) History and Development of Indian Architecture.

### INDIAN ORDER COMPOSITION (IV-YEAR)

- (a) Later Gupta Period (8th to 10th Century A.D.).
- (b) Mediaeval Order (10th to 12th Century A.D.)
- (c) Hindu-Moslem Order including Bijapur (12th to 16th Century A.D.).
- (d) Moghul Order (16th to 18th Century A.D.).
- (e) Bengal Order (8th to 16th Century A.D.).
- (f) Greater Indian Order, and a Composition of these Orders (7th to 15th Century A.D.).

# ARCHITECTURAL DESIGN

*(To be taught in the 3rd- and 4th-years. Examination at the end of the 4th-year.)*

Lectures on the Theory of Architecture, and principles of Architectural Composition. Evolution of the plan of—

- (a) Flats and Housing schemes.
- (b) Stores, factories, office buildings, shopping centres, market planning.
- (c) Advanced Hotel planning and equipment.
- (d) Creches, Sanatoria, Asylums, etc.
- (e) Health centres, stadiums, public baths, etc.
- (f) Air ports, Flying clubs.
- (g) Slum clearance schemes.
- (h) Advanced Town Planning and Landscape Architecture.

Applied problems of design based on the above to be undertaken individually by each student.

7. The subjects and marks shall be distributed as follows:—

## SECTION A

*(To be taken at the end of the Third-year)*

### GROUP I

History of Indian Architecture and Iconography ...	300	
Indian Order Composition ...	300	
Modelling (sessional work only) ...	200	
		<hr/> 800

### GROUP II

Applied Mechanics ...	300	
Reinforced Concrete ...	200	
		<hr/> 500

### GROUP III

Hygiene and Sanitation ...	200	
		<hr/>
Total Section A ...	1,500	

## SECTION B

(To be taken at the end of the Fourth-year)

## GROUP I

## Building construction—

Paper	...	... 400	} ...	800
Sessional drawings	...	... 400		
Lighting and Heating	...	...	...	200
Professional Practice	...	...	...	300
				<hr/> 1,300

## GROUP II

History of Indian Architecture and Iconography	...	300	
Indian Order Composition	...	300	
			<hr/> 600

## GROUP III

## Architectural Design—

Paper	...	...	600
Note Books and Attested Designs	...	...	1,000
			<hr/> 1,600

Total Section B ... 3,500

8. The order of merit on passing the Bachelor of Architecture Examination shall be determined by the marks obtained in Section B only.

9. As soon as possible after the Bachelor of Architecture Examination, the Syndicate shall publish lists arranged in two classes in order of merit of those who have passed the Bachelor of Architecture Examination. They shall also publish lists in alphabetical order of those who have qualified in any group of Section A showing also the group in which the candidates may yet have to qualify.

10. Pass marks for each section of the Bachelor of Architecture Examination shall be one-third in each group of subjects and half of the aggregate. In order to be placed in the first class a candidate must obtain two-thirds of the marks in Section B. The candidate who is placed first in the First Class shall receive a gold medal and prize of books to the value of Rs. 200.

11. Any candidate who has failed in one subject only, and by not more than 5 per cent. of the full marks in that subject,

and has shown merit by gaining 60 per. cent. or more in the aggregate of the marks of the examination, shall be allowed to pass.

12. If the Examiners are of opinion that in the case of any candidate not covered by the preceding Regulations, consideration ought to be allowed by reason of his high proficiency in a particular subject or in the aggregate, they shall report the case to the Syndicate, and the Syndicate may pass such candidate.

## CHAPTER LIII

### DOCTOR OF SCIENCE (ENGINEERING)

1. Any Bachelor of Engineering of the University of Calcutta may offer himself as a candidate for the Degree of Doctor of Science (Engineering).

2. Every candidate shall state in his application the special subject within the purview of the Regulations for the Degree of Bachelor of Engineering, upon a knowledge of which he rests his qualifications for the Doctorate, and shall, with the application, transmit three copies, printed or type-written, of a thesis that he has composed, treating scientifically some special portion of the subject so stated, embodying the result of research or showing evidence of his own work, whether based on the discovery of new facts observed by himself, or of new relations of facts observed by others, or tending generally to advance engineering knowledge or practice. A thesis on a new application of scientific principles or an investigation of methods or materials of practical importance in some branch of engineering, will be taken to comply with the requirements. The candidate shall indicate generally in a preface to his thesis and specially in notes, the sources from which information is taken, the extent to which he has availed himself of the work of others, and the portions of the thesis which he claims as original; he shall further state whether his research has been conducted independently, under advice, or in co-operation with others, and in what respects his investigations appear to him to advance engineering knowledge or practice.

3. Every candidate may also forward with his application three printed copies of any original contribution or contributions to the advancement of engineering knowledge or practice, or of any cognate branch of science, which may have been published by him independently or conjointly, and upon which he relies in support of his candidature.

4. No application shall be entertained unless two Members of the Faculty of Engineering or two Doctors of Science (Engineering) shall have testified, to the satisfaction of the Syndicate, that since graduating as Bachelor of Engineering, the candidate has practised his profession with repute for five years, and that in habits and character, he is a fit and proper person for the Degree of Doctor.

5. Every candidate shall forward with his application a fee of Rs. 200. No candidate, who fails to pass or present himself for examination, shall be entitled to claim a refund of the fee.

6. The thesis mentioned in paragraph 2 and the original contributions, if any, mentioned in paragraph 3, shall be referred by the Syndicate to a Board consisting of the Dean of the Faculty of Engineering and two other persons.

7. If the thesis is approved by the Board, and if the candidate has obtained a first class at the examination for the Degree of Bachelor of Engineering, he shall not be required to submit to any further written examination; but he may be required by the Board at their discretion, to appear before them to be tested orally or practically, or by both these methods with reference to the thesis and the special subject selected by him. The Board shall report to the Syndicate the result of the examination of the thesis, and of the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science (Engineering), they shall cause his name to be published with the subject of his thesis and the titles of his published contributions (if any) to the advancement of Engineering knowledge and practice and of Science generally.

8. If the candidate is a person who has obtained a second class at the examination for the Degree of Bachelor of Engineering and if his thesis is approved by the Board, he shall be required to submit to a written examination.

Two papers of three hours each shall be set, one upon the special subject mentioned in the application of the candidate and the other upon the subject of the thesis. The candidate may also be required by the Board, at their discretion, to appear before them to be tested orally or practically or by both these methods, with reference to the thesis and the special subject professed by him. The Board shall report to the Syndicate the result of the examination of the thesis and of the written examination, and also the oral and practical examinations, if any; and if the Syndicate, upon the report, consider the candidate worthy of the Degree of Doctor of Science (Engineering), they shall cause his name to be published, with the subject of his thesis, and the titles of his published contributions (if any) to the advancement of Engineering knowledge and practice and of Science generally.

9. In the case of a candidate falling under the preceding section, if the Board, upon an examination of his thesis and of his original contribution or contributions to the advancement of Engineering knowledge and practice and of Science generally, hold the same to be generally or specifically of such special excellence as to justify the exemption of the candidate from the

written examination, he may be so exempted by the Syndicate, provided that the report of the Board shall set forth the fact and the grounds of such exemption.

10. A diploma under the seal of the University, and signed by the Vice-Chancellor shall be delivered at the next Convocation for conferring degrees to each candidate who has qualified for the degree.

11. Every candidate shall be at liberty to publish his thesis and the thesis of every successful candidate shall be published by the University with the inscription: "Thesis approved for the Degree of Doctor of Science (Engineering) in the University of Calcutta."

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## CHAPTER LIII-A

### CERTIFICATES IN MILITARY STUDIES

1. Two examinations for Certificates in Military Studies shall be held annually in Calcutta on such dates as may be prescribed by the Syndicate. One shall be on the Junior Course and the other on the Senior Course and shall be called Junior Military Certificate Examination and Senior Military Certificate Examination respectively.

2. There shall be a Standing Committee in Military Studies to be annually nominated by the Syndicate consisting of not more than eleven members. At least four members will be representatives of the Military authorities and the University Training Corps.

3. Every candidate for the Junior Certificate Examination must fulfil the following conditions:—

(i) He must have been a member of the Calcutta University Training Corps during two successive academic sessions not more than one year previous to the examination.

(ii) During such membership he must have undergone individual and collective training in accordance with rules to be approved by the Syndicate.

(iii) During this period he must have attended at least 75 per cent. of lectures on selected topics to be delivered by teachers approved by the Syndicate.

Before his admission to the examination he shall produce a certificate from the Commanding Officer of the Calcutta University Training Corps to the effect that he has fulfilled the above conditions. He shall also produce a certificate of good conduct and diligent study from the head of the institution to which he belongs.

4. In order to be eligible for the Senior Certificate Examination a candidate must have passed the Junior Certificate Examination two years previously. The other conditions will be same as in Section 3 above.

5. Candidates shall pay to the University a fee to be prescribed by the Syndicate for admission to each course of study and examination.

6. Each examination shall be divided into two parts, Practical and Theoretical, each carrying 100 marks.



7. The Practical examination shall be based on drill with and without arms, weapon training and tactical training according to a programme to be prepared by the Calcutta University Training Corps Headquarters. The course for the Senior Certificate Examination shall be of an advanced character. The examination shall be sub-divided into three parts:—

- (i) General training,
- (ii) Weapon training, and
- (iii) Collective training.

The marks for the Practical examination shall be awarded on—

(a) final tests to be held at the time of the examination, and

(b) records of service of the candidates.

Detailed courses for the Practical examinations, both for Junior and Senior Examinations, will, from time to time, be determined by the Calcutta University Training Corps Headquarters.

8. The Theoretical portions shall include the following subjects:—

#### A. Junior Course

1. Military Hygiene and Camp Sanitation.
2. Map Reading and Field Sketching.
3. Discipline and *esprit de corps*.
4. History of the Army in India.
5. Badges and Symbols of Rank in the Fighting Forces.
6. Characteristics of Infantry Weapons.
7. Organisation of the Army in India.

#### B. Senior Course

1. Selected Campaigns of the Great War.
2. Organisation and Administration of an Infantry Unit in Peace and War.
3. Rolls of the Armed Forces of the Empire.
4. Characteristics of Military Weapons.
5. Imperial Military Geography with special reference to India.
6. Duties in aid of Civil Power.

Detailed syllabuses will, from time to time, be prepared by the Standing Committee hereinafter constituted subject to confirmation by the Syndicate. The Syndicate may also add to

or alter the above list of subjects on the recommendation of the Standing Committee.

9. Each candidate in order to be successful must pass the Practical and Theoretical portions separately and obtain at least 30 per cent. of marks in each. Candidates obtaining 60 per cent. of marks or over in both Practical and Theoretical portions separately shall be declared to have passed with distinction. Certificates shall be issued by the University on the results of each examination.

10. Conditions on which a candidate, who has failed to pass or appear at a military examination, may be re-admitted to a subsequent examination of the same standard shall be determined by the Syndicate on the report of the Standing Committee.

11. Examiners shall be appointed by the Syndicate on the recommendation of the Standing Committee who shall propose names in consultation with the Calcutta University Training Corps Headquarters. Only military officers and others possessing special qualifications shall be eligible for appointment as Examiners. The results of the examinations shall be considered by a Results Committee, consisting of the Vice-Chancellor as Chairman, *ex-officio*, and the Examiners. The proceedings of the Results Committee shall be placed before the Syndicate for confirmation.

The names of the successful candidates shall be classified in alphabetical order except of those who pass with distinction, whose names shall be in order of merit. The names of the successful candidates shall be published in the Gazette.

12. The result of a candidate who is successful at the Certificate Examination shall be taken into account at the next University examination at which he appears as indicated below :—

#### *I. A. and I.Sc. Examinations*

Marks in excess of 60 obtained by the candidate concerned at the Certificate Examination shall be added to his aggregate and the aggregate so obtained shall determine his division and his place in the list of successful candidates at the Intermediate Examinations.

Such candidate shall not be permitted to take up any optional subject under Chapters XXXI and XXXV of the Regulations.

#### *B. A. and B.Sc. (Pass) Examinations and B.Com. Examination*

Marks in excess of 60 obtained by a candidate at the Certificate Examination shall be added to the aggregate marks

obtained by him at the B.A. or B.Sc. (Pass) or B.Com. Examination, as the case may be.

### *B.A. and B.Sc. (Honours) Examinations*

A candidate appearing at the B.A. or B.Sc. Honours Examination in any subject shall not get any credit in his Honours subject for his success at the Certificate Examination. The marks in excess of 60 obtained by him at such examination shall however be added to the aggregate of his total marks.

### *I.E. and B.E. Examinations*

Marks obtained by a candidate at the Certificate Examination in excess of 60 shall be added to his aggregate marks at the I.E. or B.E. Examination, as the case may be.

13. The provisions of Section 12 shall be subject to the following conditions:—

(i) In no case shall the marks to be added to the aggregate be more than 75.

(ii) The marks shall be added only if a candidate passes both the Certificate Examination and the University Examination either immediately on completion of his respective studies or in the next following year.

## CHAPTER LIV

### ACADEMICAL COSTUME

Graduates shall wear—

- (i) *Dhoti* and either a black coat or a white *punjabi*,  
Or,
- (ii) White trousers and a black *chapkan* or *achkan*.  
Or,
- (iii) European dress and a college cap.

They also shall wear Gowns and Hoods for the several degrees as described below:—

*For the Degree of B.A.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of dark blue silk.

*For the Degree of B.Com.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of white silk.

*For the Degree of B.Sc.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of light blue silk.

*For the Degree of B.L.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of green silk.

*For the Degree of M.B*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of scarlet silk.

*For the Degree of B.E.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of orange-coloured silk.

*For the Degree of B.T.*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, edged on the inside with a border of purple-coloured silk.

*For the Degree of Master in the Faculties of Arts,  
Science and Law*

A black silk or stuff Gown. The Hood shall be of black silk or stuff, with a lining of silk corresponding in colour with the inside border of the Hood for Bachelor of the Faculty.

*For the Degree of Doctor of Philosophy*

A deep purple silk Gown with full sleeves and with a facing of dark blue satin. The Hood shall be of scarlet silk with a lining of dark blue satin.

*For the Degree of Doctor of Literature*

A deep purple silk Gown with full sleeves and with a facing of white satin. The Hood shall be of scarlet silk with a lining of white satin.

*For the Degree of Doctor of Science*

A deep purple silk Gown with full sleeves and with a facing of light blue satin. The Hood shall be of scarlet silk with a lining of light blue satin.

*For the Degree of Doctor of Law*

A deep purple silk Gown with full sleeves and with a facing of green satin. The Hood shall be of scarlet silk with a lining of green satin.

*For the Degree of Doctor of Medicine, Master of Surgery and Master of Obstetrics*

A deep purple silk Gown with full sleeves and with a facing of scarlet satin. The Hood shall be of scarlet silk with a lining of scarlet satin.

*For the Degree of Doctor of Science (Public Health)*

A deep purple silk Gown with full sleeves and with a facing of golden yellow satin. The Hood shall be of scarlet silk with a lining of golden yellow satin.

*For the Degree of Doctor of Science (Engineering)*

A deep purple silk Gown with full sleeves and with a facing of orange-coloured satin. The Hood shall be of scarlet silk with a lining of orange-coloured satin.

*For Honorary Degrees*

In case of recipients of Honorary Degrees the gown shall be of scarlet red colour with facing of the appropriate Faculty.

Provided that the above changes in the Regulations be enforced with effect from the Annual Convocation of 1932, and that Graduates admitted to these Degrees before 1932, will be allowed to use academic costumes of the old pattern unless they choose to use the new costume.

(Note.—The facing of satin will be four inches in width.)

---

# APPENDIX A

## MATRICULATION EXAMINATION

I certify that \_\_\_\_\_, aged \_\_\_\_\_ on the 1st of March, 19\_\_\_\_, duly passed the Matriculation Examination held in the month of \_\_\_\_\_ 19\_\_\_\_, and was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

---

## INTERMEDIATE EXAMINATION IN ARTS (OR SCIENCE)

I certify that \_\_\_\_\_ duly passed the Intermediate Examination in Arts (or Science) held in the month of \_\_\_\_\_ 19\_\_\_\_, and was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

---

## INTERMEDIATE EXAMINATION IN ARTS (OR SCIENCE) (COMPARTMENTAL)

I certify that \_\_\_\_\_ of \_\_\_\_\_ duly passed the Intermediate Examination in Arts (or Science) having been successful at the Compartmental Examination held in the month of \_\_\_\_\_, 19\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ Controller of Examinations.

---

## BACHELOR OF ARTS (OR SCIENCE)

### *Pass Diploma*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University at the Annual Examination in the year 19\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ Vice-Chancellor.

---

### *Diploma for those who pass with " Distinction "*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University with Distinction at the Annual Examination in the year 19\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ Vice-Chancellor.

---

## BACHELOR OF ARTS (OR SCIENCE)

*Honours Diploma*

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) with Honours in this University at the Annual Examination in the year 19\_\_\_\_, and that he was placed in the Class in \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF ARTS (OR SCIENCE) (COMPARTMENTAL)

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Arts (or Science) in this University having been successful at the Compartmental Examination held in the month of 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## MASTER OF ARTS (OR SCIENCE)

This is to certify that \_\_\_\_\_ obtained the degree of Master of Arts (or Science) in this University at the Annual Examination in the year 19\_\_\_\_, the special branch in which he was examined having been \_\_\_\_\_ and that he was placed in the \_\_\_\_\_ Class.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF COMMERCE

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Commerce in this University at the Annual Examination in the year 19\_\_\_\_, and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## BACHELOR OF COMMERCE (COMPARTMENTAL)

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Commerce in this University having been successful at the Compartmental Examination held in the month of 19 \_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 \_\_\_\_.

Vice-Chancellor.

---

## DOCTOR OF PHILOSOPHY

This is to certify that  
of Doctor of Philosophy in  
year 19 .

obtained the degree  
in this University in the

SENATE HOUSE,  
*The* , 19 .

*Vice-Chancellor.*

---

## DOCTOR OF SCIENCE

This is to certify that  
of Doctor of Science in  
the year 19 .

obtained the degree  
in this University in

SENATE HOUSE,  
*The* , 19 .

*Vice-Chancellor.*

---

## CERTIFICATE IN TANNING

This is to certify that , duly passed  
the examination for the Certificate in Tanning held in the month of  
19 , and that he was placed in the Class.

SENATE HOUSE,  
*The* , 19 .

*Controller of Examinations.*

---

## LICENTIATE IN TEACHING

(I)

This is to certify that passed the  
examination for a Licentiate in Teaching at the Annual Examination in  
the year 19 , and that he was placed in the Class.

SENATE HOUSE,  
*The* , 19 .

*Controller of Examinations.*

(II)

This is to certify that passed the Examination for  
a Licentiate in Teaching in the year .

SENATE HOUSE,  
*The* , 19 .

*Controller of Examinations.*

---

## BACHELOR OF TEACHING

(I)

This is to certify that obtained the degree  
of Bachelor of Teaching in this University at the Annual Examination in  
the year 19 , and that he was placed in the Class.

SENATE HOUSE,  
*The* , 19 .

*Vice-Chancellor.*



## (II)

This is to certify that \_\_\_\_\_ obtained the degree of Bachelor of Teaching in this University, having passed the examination in the year 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.

---

## DIPLOMA IN SPOKEN ENGLISH

This is to certify that \_\_\_\_\_ has been granted the Diploma in Spoken English, he having passed in the Class at the Annual Examination of this University held in the year 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Vice-Chancellor.

---

## ENGLISH TEACHERSHIP CERTIFICATE EXAMINATION

I certify that \_\_\_\_\_ duly passed the Examination for the English Teachership Certificate held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## TEACHERS' TRAINING CERTIFICATE (GENERAL)

This is to certify that \_\_\_\_\_ duly passed with Distinction the Examination for the Teachers' Training Certificate (General), held in the month of \_\_\_\_\_, 19 .

He received training in the methods of teaching the following subjects :

- (1)
- (2)

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## TEACHERS' TRAINING CERTIFICATE (GENERAL)

This is to certify that \_\_\_\_\_ duly passed the Examination for the Teachers' Training Certificate (General), held in the month of \_\_\_\_\_, 19 .

He received training in the methods of teaching the following subjects :

- (1)
- (2)

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

**TEACHERS' TRAINING CERTIFICATE (GEOGRAPHY)**

This is to certify that \_\_\_\_\_ duly passed with  
Distinction the Examination for the Teachers' Training Certificate (Geo-  
graphy), held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

**TEACHERS' TRAINING CERTIFICATE (GEOGRAPHY)**

This is to certify that \_\_\_\_\_ duly passed  
Examination for the Teachers' Training Certificate (Geography), held  
the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

**TEACHERS' TRAINING CERTIFICATE (SCIENCE)**

This is to certify that \_\_\_\_\_ duly passed with  
Distinction the Examination for the Teachers' Training Certificate (Science),  
held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

**TEACHERS' TRAINING CERTIFICATE (SCIENCE)**

This is to certify that \_\_\_\_\_ duly passed the  
Examination for the Teachers' Training Certificate (Science), held in the  
month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

**TEACHERS' TRAINING CERTIFICATE (ART APPRECIATION)**

This is to certify that \_\_\_\_\_ duly passed with  
Distinction the Examination for the Teachers' Training Certificate (Art  
Appreciation) held in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

**TEACHERS' TRAINING CERTIFICATE (ART APPRECIATION)**

This is to certify that \_\_\_\_\_ duly passed the  
Examination for the Teachers' Training Certificate (Art Appreciation) held  
in the month of \_\_\_\_\_, 19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

## PRELIMINARY EXAMINATION IN LAW

This is to certify that \_\_\_\_\_ duly passed the  
 Preliminary Examination in Law, held in the month of \_\_\_\_\_, 19\_\_\_\_,  
 and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Controller of Examinations.*

## INTERMEDIATE EXAMINATION IN LAW

This is to certify that \_\_\_\_\_ duly passed the  
 Intermediate Examination in Law, held in the month of \_\_\_\_\_,  
 19\_\_\_\_, and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Controller of Examinations.*

## BACHELOR OF LAW

*Diploma*

This is to certify that \_\_\_\_\_ obtained the Degree  
 of Bachelor of Law in this University at the Examination held in the month  
 of \_\_\_\_\_, 19\_\_\_\_, and that he was placed in the \_\_\_\_\_ Division.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Vice-Chancellor.*

## MASTER OF LAW

This is to certify that \_\_\_\_\_ obtained the degree  
 of Master of Law in this University at the Annual Examination in the year  
 19\_\_\_\_, and that he was placed in the \_\_\_\_\_ Class.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Vice-Chancellor.*

## DOCTOR OF LAW

This is to certify that \_\_\_\_\_ obtained the degree  
 of Doctor of Law in this University in the year 19\_\_\_\_.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Vice-Chancellor.*

## PRELIMINARY SCIENTIFIC M.B. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
 Preliminary Scientific Examination for the degree of M.B., held in the month  
 of \_\_\_\_\_, 19\_\_\_\_.

SENATE HOUSE,  
 The \_\_\_\_\_, 19\_\_\_\_. \_\_\_\_\_ *Controller of Examinations.*

## FIRST M.B. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
First Examination for the degree of M.B., held in the month of \_\_\_\_\_,  
19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## SECOND M.B. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
Second Examination for the degree of M.B., held in the month of \_\_\_\_\_,  
19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## THIRD M.B. EXAMINATION

This is to certify that \_\_\_\_\_ duly passed the  
Third Examination for the degree of M.B., held in the month of \_\_\_\_\_,  
19 .

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## FIRST, SECOND OR THIRD M.B. EXAMINATION

*Honours Certificate*

This is to certify that \_\_\_\_\_ duly passed the  
First  
Second Examination for the degree of M.B., held in the month of \_\_\_\_\_,  
Third  
19 .

He obtained Honours in \_\_\_\_\_.

SENATE HOUSE,  
The \_\_\_\_\_, 19 .

Controller of Examinations.

---

## FINAL M.B. EXAMINATION

*Pass Diploma*

This is to certify that \_\_\_\_\_, having  
completed the curriculum of study and passed in \_\_\_\_\_ the  
examinations required by the Regulations of this University (sanctioned by  
the Governor-General of India in Council in accordance with the Act of  
Incorporation and the Indian Universities Act, 1904) for the degree of  
Bachelor of Medicine, which has been duly conferred upon him, is hereby

declared competent and authorised to practise Medicine, Surgery and Midwifery.

Dated at Calcutta, this \_\_\_\_\_ day of \_\_\_\_\_  
19 .

*President of the Board of Examiners.*

*Vice-Chancellor..*

*Controller of Examinations.*

(Signature of the Graduate.)

---

## FINAL M.B. EXAMINATION

### *Honours Diploma*

This is to certify that \_\_\_\_\_, having completed the curriculum of study and passed in \_\_\_\_\_, the examinations required by the Regulations of this University (sanctioned by the Governor-General of India in Council in accordance with the Act of Incorporation and the Indian Universities Act, 1904) for the degree of Bachelor of Medicine, which has been duly conferred upon him, is hereby declared competent and authorised to practise Medicine, Surgery and Midwifery.

He obtained Honours in \_\_\_\_\_.

Dated at Calcutta, this \_\_\_\_\_ day of \_\_\_\_\_, ..  
19 .

*President of the Board of Examiners.*

*Vice-Chancellor.*

*Controller of Examinations.*

(Signature of the Graduate.)

---

## DOCTOR OR MASTER IN THE FACULTY OF MEDICINE

### *Diploma*

We, the Vice-Chancellor, the Dean of the Faculty of Medicine, and the Controller of Examinations of the University of Calcutta, do hereby make known that, in the year 19 \_\_\_\_\_, \_\_\_\_\_ has been admitted to

the degree of Doctor of Medicine,  
Master of Surgery, he having been first certified by duly  
Master of Obstetrics,  
appointed Examiners to be qualified to receive the same.

SENATE HOUSE,

The \_\_\_\_\_, 19 .

*Vice-Chancellor..*

*Dean of the Faculty of Medicine.*

*Controller of Examinations.*

---

## DIPLOMA IN PUBLIC HEALTH

We, the Vice-Chancellor, the Dean of the Faculty of Medicine, and the Controller of Examinations of the University of Calcutta, do hereby make known that, in the year 19 , has been granted the Diploma of Public Health, he having been first certified by duly appointed Examiners to be qualified to receive the same.

SENATE HOUSE,

The , 19 .

Vice-Chancellor.

Dean of the Faculty of Medicine.

Controller of Examinations.

---

DIPLOMA FOR THE DEGREE OF DOCTOR OF SCIENCE  
(PUBLIC HEALTH)

This is to certify that obtained the degree of Doctor of Science (Public Health), in this University at the Annual Examination in the year 19 .

SENATE HOUSE,

The , 19 .

Vice-Chancellor.

---

## INTERMEDIATE EXAMINATION IN ENGINEERING

I certify that duly passed the Intermediate Examination in Engineering, held in the month of , 19 .

SENATE HOUSE,

The , 19 .

Controller of Examinations.

---

## BACHELOR OF ENGINEERING

*Diploma*

This is to certify that obtained the degree of Bachelor of Engineering in this University at the Annual Examination in the year 19 , the special branch in which he was examined having been and that he was placed in the Class.

SENATE HOUSE,

The , 19 .

Vice-Chancellor.

---

## BACHELOR OF METALLURGY EXAMINATION, SECTION B

I certify that \_\_\_\_\_ duly passed the  
 Section B of the Bachelor of Metallurgy Examination held in the month of  
 19 .

SENATE HOUSE,  
 The , 19 .

Controller of Examinations.

---

## BACHELOR OF METALLURGY

*Diploma*

This is to certify that \_\_\_\_\_ obtained the degree  
 of Bachelor of Metallurgy in this University at the Annual Examination  
 in the year 19 , and that he was placed in the \_\_\_\_\_ Class.

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

---

## DOCTOR OF SCIENCE (ENGINEERING)

This is to certify that \_\_\_\_\_ obtained the degree  
 of Doctor of Science (Engineering) in this University at the Annual Exa-  
 mination in the year 19 .

SENATE HOUSE,  
 The , 19 .

Vice-Chancellor.

---

## JUNIOR MILITARY CERTIFICATE EXAMINATION

This is to certify that \_\_\_\_\_ duly  
passed  
passed with Distinction the Junior Military Certificate Examination held  
 in the month of \_\_\_\_\_ 19 .

SENATE HOUSE,  
 The , 19 .

Controller of Examinations.

---

## SENIOR MILITARY CERTIFICATE EXAMINATION

This is to certify that \_\_\_\_\_ duly  
passed  
passed with Distinction the Senior Military Certificate Examination held  
 in the month of \_\_\_\_\_ 19.

SENATE HOUSE,  
 The , 19 .

Controller of Examinations.

---

**FORM OF ADMISSION REGISTER TO BE MAINTAINED BY AFFILIATED COLLEGES UNDER SECTION 4,  
CHAPTER XX OF THE REGULATIONS**

1	2	3	4	5	6	7	8	
Serial No.	(a) Name of the student, (b) Home address, and (c) Local address.	Age according to the Matriculation Certificate.	Father's name, occupation and address. If father is not alive, the same particulars in respect of the other guardian with relationship.	(a) Race, (b) Religion, (c) Caste of the student, (d) Married or unmarried.	Local guardian (Name, occupation, address and relationship.)	School or College last attended (in the case of a student migrating from a different University or Board the name of the University or the Board should also be noted).	University Examinations passed or taken with Roll and Number and Division in each case.	
9	10	11	12	13	14	15	16	17
Number and date of Transfer Certificate, if any, with the name of the institution concerned.	Number and date of University permission letter (in case of a student admitted on migration).	Date of admission.	Course and Class to which admitted.	Combination taken.	University Regn. No. with year.	Roll and No. as in the College records.	Initial of the Principal.	REMARKS



**FORM OF TRANSFER CERTIFICATE PRESCRIBED BY THE  
SYNDICATE UNDER SECTION 22, CHAPTER XXIII  
OF THE REGULATIONS**

No.....

Certified that.....  
son of....., an inhabitant  
of....., has been a student in the.....year class of  
the.....College from.....to.....19 .  
His conduct has been.....  
I know nothing against his character. (1)

All sums due by him to the College have been paid, including College  
fees up to....., 19 .

His (2).....scholarship, of Rupees.....per mensem.  
has been drawn and paid to him in this College up to....., 19 ,

His attendance in each course of Lectures (3) is given below :—

Subject							
Number of Lectures—							
Delivered							
Attended							

(Remarks.—Here entries may be made under Sections 24, 25, 26 of  
Chapter XXIII of the Regulations.)

.....  
*Principal.*

*The....., 19 .*

.....*College.*

**TRANSFER CERTIFICATE ISSUED UNDER SECTION 26A,  
CHAPTER XXIII OF THE REGULATIONS**

No.....

Certified that.....  
son of....., an inhabitant  
of.....has been a student in the.....  
year class of the.....College from.....  
to....., 19 .

(1) If anything is known against the character of the student this  
should be suitably altered.

(2) To be filled up in the case of Government scholars only.

(3) See Section 4, Chapter XXVI of the Regulations.

His University Registration Number is.....of.....  
 All sums due from him to the college have been paid, including college fees up to....., 19 .

His (1).....scholarship, of Rupees.....per mensem has been drawn and paid to him in this college up to....., 19 .

His attendance in each course of lectures (2) is given below :—

Subject							
Number of Lectures							
Delivered							
Attended							

*Remarks.*—Here entries may be made under Sections 24, 25, 26 of Chapter XXIII of the Regulations.

.....  
*Principal.*

*The*....., 19 .

.....*College.*

### FORM OF NOMINATION PAPER

*(Prescribed by the Syndicate under Section 4, Chapter XII of the Regulations)*

I, ..... do hereby nominate .....for election by the Faculty of.....as an Ordinary Fellow of the Calcutta University, subject to the approval of His Excellency the Chancellor.

The following is a brief statement of the special qualifications of my nominee :—

*Signature*.....

*The*....., 19 .

*Member of the Faculty of*.....

- (1) To be filled up in the case of Government Scholars only.  
 (2) See Section 4, Chapter XXVI of the Regulations.



**FORM OF ANNUAL RETURN TO BE SUBMITTED BY AFFILIATED  
COLLEGES ON OR BEFORE THE 1ST OF AUGUST**

*(Prescribed under Section 7, Chapter XX of the Regulations)*

1. Names of the members of the Governing Body.
2. Names and qualifications of the teaching staff, and the subjects and classes taught by each.
3. The subjects taught in each class.
4. The number of students in each class and the number of students who have taken the different optional subjects.
5. The number of students who reside—
  - (a) with parents or guardians ;
  - (b) in the collegiate hostel, if any ;
  - (c) in non-collegiate hostels ;
  - (d) in attached messes ;
  - (e) in unattached messes ;
  - (f) in private lodgings.
6. Income during the preceding twelve months—
  - (a) from fees ;
  - (b) from fines ;
  - (c) from Govt. Grant, if any ;
  - (d) from University Grant, if any ;
  - (e) from endowments, if any ;
  - (f) from donations and subscriptions, if any ;
  - (g) miscellaneous.
7. Expenditure during the preceding twelve months—
  - (a) Salaries of the Staff ;
  - (b) Buildings ;
  - (c) Library ;
  - (d) Laboratory ;
  - (e) Miscellaneous.
8. Rate of fees charged—
9. Number of students whose fees are remitted—
  - (a) in whole ;
  - (b) in part.
10. Number of students in receipt of Scholarships—
  - (a) from Government ;
  - (b) from Public Funds ;
  - (c) from University Funds ;
  - (d) from Endowments ;
  - (e) from College Funds ;
  - (f) from private donors.

*Signature of the Secretary to the  
Governing Body.*

*The....., 19 .*

# APPENDIX B

## ASTRONOMY

### B.A. AND B.Sc. STANDARD

*Instruments for Practical teaching in Astronomy (Honours Course)*  
 Transit Theodolite.  
 Sidereal Chronometer.  
 Sextant.

—Approximate cost, Rs. 800

## PHYSICS

### A.—INTERMEDIATE STANDARD

#### (a) List of Apparatus for Practical Class of 20 Students

Half-metre scale	..	..	..	..	6
Metre scale	..	..	..	..	6
Steel scales (30 cms.)	..	..	..	..	3
Diagonal scale	..	..	..	..	6
Slide Callipers	..	..	..	..	6
Spirit Levels	..	..	..	..	6
Plumb lines	..	..	..	..	3
Vernier (Linear)	..	..	..	..	3
Vernier (Circular)	..	..	..	..	3
Glass Scales and plates	..	..	..	..	6
Micrometer Screw Gauge	..	..	..	..	6
Students' Spherometer	..	..	..	..	6
Protractors	..	..	..	..	6
Stop clocks	..	..	..	..	4
Tall Glass jars	..	..	..	..	6
Nicholson's Hydrometer	..	..	..	..	6
Hare's apparatus	..	..	..	..	3
Boyle's Law apparatus	..	..	..	..	2
Beam Compass	..	..	..	..	2
Drawing Boards	..	..	..	..	6
Fortin's Barometer	..	..	..	..	1
Inclined Plane	..	..	..	..	1
Friction apparatus	..	..	..	..	1
Balance	..	..	..	..	4
Weight Boxes	..	..	..	..	6
Wooden Bridges	..	..	..	..	6
Precision balance	..	..	..	..	1
Pendulum and stand	..	..	..	..	6
Basins	..	..	..	..	6
Beakers	..	..	..	..	2 doz.
Watch glasses	..	..	..	..	1 doz.
Big Glass Funnels	..	..	..	..	6
Graduated Cylinders	..	..	..	..	4
Drawing Pins	..	..	..	..	1 gross.
Thermometer	..	..	..	..	12
Hypsometer	..	..	..	..	3
Calorimeter	..	..	..	..	6
Steam Jacket	..	..	..	..	3
Boiler	..	..	..	..	3

Optical Bench .. ..	2
Fourway candle holder .. ..	4
Concave mirror .. ..	4
Ground glass screen .. ..	6
Convex lens .. ..	6
Small plane mirror mounted on wooden block .. ..	6
Rectangular glass slab .. ..	6
Ordinary glass prism .. ..	6
Bunsen's Photometer .. ..	2
Tuning Fork .. ..	3
Barometer tubes .. ..	6
Glass tubes .. ..	10 lbs.
Glass rod .. ..	3
Ebonite rod .. ..	3
Electroscope .. ..	3
Electrophorus .. ..	3
Insulated sphere .. ..	3
Rubbers .. ..	3
Bunsen's cell .. ..	2
Daniell's cell .. ..	2
Leclanche's cell .. ..	6
Storage cell .. ..	2
(where electric supply is available)	
D'Arsonval Galvanometer .. ..	1
Tangent Galvanometer .. ..	1
Astatic Galvanometer .. ..	1
Ammeter .. ..	1
Voltmeter .. ..	1
Post Office Box .. ..	2
Metre Bridge .. ..	3
Rheostat .. ..	3
Resistance coils .. ..	6
Bar Magnet .. ..	6
Small Compass needle .. ..	6
Bunsen Burner .. ..	6
Tripod stand .. ..	6
Retort Stands and Clamps .. ..	6
Fish-tail Burner .. ..	1
Wire Gauze 6" x 6" .. ..	12
Lens Holders .. ..	6
Corkborers .. ..	1 set
Wooden stands with clamp .. ..	3

(b) *List of Apparatus for Lecture Purpose*

## Miscellaneous—

Strong adjustable table.  
 Adjustable stands.  
 Bunsen's Universal holder.  
 Wooden holders.  
 Set of wooden cubes.  
 Set of wooden cylinders.  
 Set of wooden discs.  
 Bunsen Burners.  
 Spirit Lamps.  
 Glass Flasks.

Glass burettes.  
Glass funnels.  
Glass beakers.  
Cylindrical glass measures.  
Glass tubing.  
India rubber tubing.  
Wire gauze.

### General Physics—

Archimedes' apparatus.  
Specific gravity bottle.  
U-shaped communicating vessel.  
Hare's apparatus.  
Aneroid barometer.  
Spring balance.  
Inclined plane.  
Parallelogram of forces apparatus.  
Hydrostatic balance.  
Pulleys.  
Apparatus for demonstrating the Laws of Levers.  
Model of Hydraulic Press.  
Lift pump.  
Force pump.  
Model of Fire Engine.  
Fire Syringe.  
Hydrometers.  
Transmission of Fluid Pressure Apparatus.  
Barker's mill.  
Communicating vessel apparatus.  
Pascal's apparatus.  
Cartesian figures.  
Apparatus for showing upward pressure of water.  
Baroscope.  
Siphon.  
Cylinder for showing the fall of bodies in a vacuum.  
Rubber tube.  
Hero's fountain.  
Vacuum pump with receiver.  
Bell-jar.  
Vacuum gauge.  
Flask for showing weight of air.  
Magdeburg hemispheres.  
Tantalus Cup.  
Foot bellows.

### Heat—

Thermometers.  
Maximum and Minimum Thermometers.  
Dry and Wet Bulb Thermometers.  
Daniell's Hygrometer.  
Regnault's Hygrometer with aspirator.  
Pyrometer.  
Ball and Ring apparatus.  
Boyle's Law Apparatus with air-bulb attachment.  
Bar breaking apparatus.  
Compound brass and iron rod.  
Pullinger's apparatus.

Apparatus for determining the boiling point of water.  
 Conducting power apparatus.  
 Ingenhausz's apparatus.  
 Glazebrooke's apparatus for convection-current.  
 Model Thermometer for expansion of liquids.  
 Weight Thermometer.  
 Dilatometer.  
 Pyknometer.  
 Expansion of liquid apparatus.  
 Hope's apparatus.  
 Vapour pressure apparatus.  
 Davy's Safety Lamp.  
 Ritchie's apparatus for absorbing and emissive powers.  
 Differential air thermometers.  
 Leslie's cube.  
 Whirling table for boiling liquids by friction.  
 Model of Steam Engine.  
 Model of Internal Combustion Engine.

### Light—

Heliostat with attachment of adjustable slit and diaphragm.  
 Travelling Microscope.  
 Telescope.  
 Rumford's Photometer.  
 Grease-spot Photometer.  
 Convex and Concave Mirrors.  
 Adjustable slit.  
 Angular Mirrors.  
 Parallel Mirrors.  
 Convex and Concave Lenses, mounted and unmounted.  
 Glass troughs.  
 Set of 6 Lecture lenses.  
 Set of Prisms.  
 Hartley's optical disc with following attachments :—
 

- (1) Plane Mirror.
- (2) Concave-Convex Mirror.
- (3) Double Convex lens.
- (4) Prism 45 and 90 .
- (5) Prism 45 and 60 .
- (6) Double Concave lens.

 Apparatus for proving laws of reflection.  
 Apparatus for showing refraction of rays in liquids.  
 Newton's colour disc.  
 Spectrometer.  
 Projection apparatus.  
 Model of the Eye.  
 Camera.  
 Prismatic Binocular.  
 Phosphorescent substances.  
 Flusorecent liquids.

### Sound—

Slotted weights.  
 Transverse Wave Machine.  
 Bell-experiment apparatus.  
 Spring balance monochord.  
 Resonance apparatus.



Tuning Forks.  
 Set of four Organ pipes.  
 Organ pipe with centre stop.  
 Large Organ pipe for showing nodes and antinodes.  
 Organ pipe with movable piston.  
 Rotating mirror.  
 Manometric flame apparatus.  
 Square Chladni's Plates.  
 Circular Chladni's Plates.  
 Savart's toothed wheel.  
 Cagniard de la Tour's Siren.  
 Revolving table.  
 Bellows with four Valves.  
 Model of the Ear.  
 Phonograph.

### Frictional Electricity—

Rods of glass, ebonite, sealing wax.  
 Rod—half glass, half brass.  
 Faraday's ice-pails.  
 Roll of tin-foil on glass tube.  
 Wimshurst machine.  
 Voss machine.  
 Electric whirl.  
 Insulating stool.  
 Electrical chimes.  
 Sliding condenser.  
 Spherical conductor.  
 Cylindrical conductor.  
 Conical conductor.  
 Two equal brass spheres for showing induced charges.  
 Hollow brass sphere with a hole at the top.  
 Biot's apparatus.  
 Gold-leaf electroscope.  
 Pith ball pendulum.  
 Rubbers.  
 Flannel.  
 Silk.  
 Catskin.  
 Proof plane.  
 Electrophorous.  
 Leyden jar.  
 Detachable Leyden jar.  
 Discharger.

### Magnetism—

Lodestone.  
 Large Bar magnets.  
 Horse-shoe magnet.  
 Compass needle.  
 Magnetic needles.  
 Dip circle.  
 Prismatic compass.  
 Electromagnet.  
 Mariner's compass.  
 Deflection Magnetometer.  
 Steel Watch Spring and Knitting Needles.  
 Iron Filings.

**Voltaic Electricity—****Oersted's apparatus.****Lecture apparatus for showing—**

- (a) rotation of magnet round current.
- (b) rotation of current round magnet.
- (c) rotation of current round current.

**Lecture galvanometer.****Barlow's wheel.****Roget's vibrating spiral.****Floating battery.****Zinc and copper plates.****Bichromate cell.****Bunsen's cell.****Daniell's cell.****Leclanché's cell.****Dry cell.****Grove cell.****Storage cell.****Voltaic pile.****Meter bridge.****Voltmeter.****Ammeter.****Galvanometers—Astatic, D'Arsonval type, Tangent.****Resistance boxes.****Electric arc.****Ampere's apparatus.****Demonstration dynamo.****Demonstration motor.****Electric bell.****Morse transmitter.****Morse sounder.****Telephone receiver.****Electromagnet.****Microphone.****Pohl's commutator.****Apparatus for illustrating induced currents.****Induction Coil.****Copper Voltmeter.****Water Voltmeter.****Silver Voltmeter.****Joule's Calorimeter.****Thermopile.****Geissler's tubes.****Crook's vacuum tubes for demonstrating phenomena of discharge at different degrees of exhaustion.****Apparatus for showing deflection of cathode rays by magnetic field.****Shadow tube.****Apparatus for showing mechanical action of cathode rays.****—Approximate cost, Rs. 5,000.****B.—B.A. OR B.Sc. STANDARD**

- (a) *List of Apparatus for Practical Class of not more than 15 Students  
(in addition to that for Intermediate Course)*

Workshop tools	..	..	..	..	..	4
Sensitive balance	..	..	..	..	..	1
Precision balance	..	..	..	..	..	1

Weight boxes	..	..	..	..	..	6
Spherometers	..	..	..	..	..	3
Screw gauges	..	..	..	..	..	3
Callipers	..	..	..	..	..	3
Specific gravity bottles	..	..	..	..	..	6
Young's modulus apparatus (2 forms)	..	..	..	..	..	2
Pendulums	..	..	..	..	..	3
Linear expansion of rods and tubes—travelling microscopes and spherometer	..	..	..	..	..	2
Constant pressure air thermometer	..	..	..	..	..	1
Constant volume air thermometer	..	..	..	..	..	1
Calorimeters	..	..	..	..	..	6
Regnault's hygrometer	..	..	..	..	..	1
Wet and dry bulb hygrometer	..	..	..	..	..	1
Tuning forks (large size)	..	..	..	..	..	6
Apparatus for determining the velocity of sound by resonance	..	..	..	..	..	1
Sonometer	..	..	..	..	..	2
Bunsen Burners	..	..	..	..	..	6
Optical bench and accessories	..	..	..	..	..	2
Concave lenses of different focal lengths	..	..	..	..	..	6
Convex lenses of different focal lengths	..	..	..	..	..	6
Concave mirrors of different focal lengths	..	..	..	..	..	3
Convex mirrors of different focal lengths	..	..	..	..	..	3
Spectrometer	..	..	..	..	..	1
Spectroscope	..	..	..	..	..	1
Travelling microscope	..	..	..	..	..	1
Apparatus for determining $\mu$ by total reflection	..	..	..	..	..	1
Deflection magnetometer	..	..	..	..	..	2
Apparatus for determining the time period of vibration of a magnet	..	..	..	..	..	2
Dip circle	..	..	..	..	..	1
Ammeter	..	..	..	..	..	2
Milliammeter	..	..	..	..	..	1
Voltmeter	..	..	..	..	..	2
Millivoltmeter	..	..	..	..	..	1
D'Arsonval Galvanometer (suspended and pointer types)	..	..	..	..	..	3
Tangent galvanometer (Helmholtz type)	..	..	..	..	..	1
Post Office Box	..	..	..	..	..	3
Potentiometer	..	..	..	..	..	2
Metre bridge	..	..	..	..	..	3
Resistance coils and rheostats	..	..	..	..	..	12
Storage cells	..	..	..	..	..	3
Leclanché's cells	..	..	..	..	..	6

—Approximate cost, Rs. 2,000.

*Additional Apparatus for Honours Course*

Precision balance	..	..	..	..	..	2
Precision weight boxes with riders	..	..	..	..	..	2
Travelling microscopes	..	..	..	..	..	3
Apparatus for determining Young's modulus by bending	..	..	..	..	..	1
Surface tension apparatus	..	..	..	..	..	1
Regnault's Calorimeter	..	..	..	..	..	1
Precision Thermometers reading to a degree Centigrade	..	..	..	..	..	6
Dumas' apparatus for vapour density	..	..	..	..	..	1
Victor Meyer's Do.	..	..	..	..	..	2
Clement and Desormes's apparatus	..	..	..	..	..	1
Searle's conductivity apparatus	..	..	..	..	..	1
Kundt's tube	..	..	..	..	..	1
Precision spectrometer	..	..	..	..	..	1

Optical Bench with accessories for bi-prism, double mirror	..	1
Biprism	..	1
Nodal point apparatus	..	1
Diffraction gratings (1000, 2000 and 6000 lines per cm.)	..	3
Hydrogen, Neon, Helium tubes	..	3
Small Induction coil	..	1
Single and double slits	..	1
Calendar and Barnes' calorimeter	..	1
D'Arsonval Galvanometer (sensitivity 10)	..	3
Platinum Resistance Thermometer	..	1
Standard Resistance (10, 1, .1)	..	1
Standard cell	..	1
Accurate Potentiometer	..	1
—Approximate cost, Rs. 1,500.		

(b) *List of Apparatus for Lecture Purpose*

## Miscellaneous—

Large projection lantern.  
 Apparatus for projection of horizontal objects.  
 Large projection screen.  
 Bunsen's Universal holder.  
 Water Bath.  
 Specific Gravity bottles.  
 Aneroid Barometer.  
 Rotary Air Pump.

## General Ideas—

Apparatus for the production of stationary waves.  
 Apparatus for showing interference of waves.  
 Soap film frames.  
 Capillary tubes with stand.  
 Capillary plates.  
 Cohesion plates for suspension from balance.

## Heat—

Bregne's metal thermometer.  
 Joule's apparatus for showing contraction of a stretched India rubber tube by heat.  
 Right-angled bent glass tube for showing the circulation of water.  
 Davy's Safety Lamp.  
 Apparatus for showing the difference in the expansibility of various liquids.  
 Gay-Lussac's apparatus for proving Dalton's Law.  
 Apparatus to show boiling at low pressure.  
 Wollaston's cryophorus.  
 Pulse glass.  
 Arrangement for melting ice-block by means of a loaded wire.  
 Melloni's apparatus for illustrating radiation, absorption and reflection of heat.  
 Model of Otto-cycle.

## Light—

Apparatus for showing total reflection.  
 Right-angled crown glass prism.  
 Pair of achromatic prisms on stand.  
 Prism with adjustable angle for liquids on stand.

Three small direct vision spectroscopes.  
 Phosphorescent substances.  
 Model of the eye.  
 Stereoscope and pictures.  
 Absorption trough.  
 Two prismatic troughs.  
 Chart of various spectra.  
 Fluorescent liquids.  
 Cubes of Uranium and Fluorspar.  
 Lantern slides illustrating various optical effects.  
 Model of sextant.  
 Small telescope.  
 Fresnel's mirrors.  
 Fresnel's bi-prism.  
 Diaphragm with various apertures for showing diffraction.  
 Norrenberg's polariscope.  
 Set of apparatus for use with the same  
 Tourmaline tongs.  
 Rhomb of Iceland spar.  
 Newton's colour rings.  
 Nicol's prisms.  
 Polarimeter.  
 Wollaston's double image prism.

#### Sound—

Burner for sensitive flame.  
 Glass bell on stand for showing no sound.  
 Chladni's plate.  
 Trevelyan rocker.  
 Chemical harmonicon.  
 Manometric jet.  
 Revolving mirror on stand.  
 Additional organ pipes.  
 Pipe with free reed.  
 Pipe with striking reed.  
 Set of resonators.  
 Interference tube.  
 Airy's double pendulum.  
 Chronographic tuning fork.  
 Phonograph.  
 Telephone receiver.  
 Microphone.

#### Electricity and Magnetism—

Condenser.  
 Additional illustrative apparatus in frictional electricity.  
 Voltaic pile.  
 Dry cells.  
 Storage cells.  
 Lecture-room ammeter.  
 Lecture-room Voltmeter.  
 Simple galvanoplastic apparatus.  
 Large electromagnet.  
 Morse telegraph.  
 Barlow's wheel.  
 Lecture apparatus for showing rotation of magnets and currents  
 under electromagnetic forces.  
 Arago's apparatus for showing induced currents.  
 Model of a Gramme ring.

Small dynamo and hand wheel.  
 Small model motor.  
 Induction coil giving 3" or 4" spark.  
 Vacuum tubes.  
 Crook's tubes.  
 Seebeck's thermo-electric apparatus.  
 Thermo-electric pile.  
 Photo-electric cell.  
 Thermionic valve.  
 Electrometer.  
 Earth inductor.  
 Model of a transformer.  
 Rotary converter.

—Approximate cost, Rs. 2,500.

### C.—M.A. OR M.Sc. STANDARD

For this standard there must be a complete collection of apparatus for Advanced Practical work.

(a) *Optic*.—The equipment of the optical room shall include instruments for accurate measurement such as spectroscopes, spectrometers, polarimeters, optical bench, refractometers, reading microscopes, etc.—Probable minimum cost, Rs. 3,000.

(b) *Electricity and Magnetism*.—The electrical room shall be fitted with sensitive mirror galvanometers and there shall be an adequate supply of instruments for electrical and magnetic measurement, i.e., resistance boxes, galvanometers, electrometers, magnetometers, standard resistances, standard capacities, standard cells, etc., besides auxiliary apparatus such as an induction coil with 8"-10" spark, a powerful electromagnet, electric motors, etc.—Probable minimum cost, Rs. 3,500.

An accumulator battery shall form part of the electric installation, if any.

(c) *Heat*.—Additional apparatus for accurate work in calorimetry, thermometry, conduction, radiation, expansion, etc.—Probable minimum cost, Rs. 2,000.

(d) *General Physics and Sound*.—Additional apparatus for accurate work in elasticity, vapour density, capillarity, fluid friction, etc., and sound—Probable minimum cost, Rs. 1,500.

(e) *Workshop Equipment, including Lathe*.—Probable minimum cost Rs. 350.

## PHYSIOLOGY

### A.—INTERMEDIATE STANDARD

(a) *List of Apparatus, etc., for Practical Class of 24 Students*

Microscopes, one doz.  
 Dissecting instruments and razors, etc.  
 Gas burners (Bunsen),  $1\frac{1}{2}$  doz.  
 Test tube stands,  $1\frac{1}{2}$  doz.  
 Retort stands with rings, etc., 1 doz.  
 Glass bottles, etc.  
 Thermometers, 1 doz.  
 Test tubes and glass beakers.  
 Glass flasks and measures.  
 Glass tubing and rods and funnels.

Porcelain crucibles, etc.  
 One balance.  
 One Microtone (ice-freezing).  
 One Haemocytometer (Zeiss).  
 One Haemoglobinometer (Gowar's).

—Approximate cost, Rs. 1,850

(b) *List of Apparatus and Appliances for Lecture Purposes*

One Human Skeleton.  
 Set of 50 diagrams (3 ft. by 2 ft.).  
 Ordinary apparatus and appliances for illustrating lectures of  
 Chemical Physiology.  
 One simple recording drum (with clock-work).  
 One time marker.  
 One muscle-lever myograph.  
 Two simple stands for ditto.  
 One induction coil.  
 Two electric keys.  
 One commutator.  
 Four bichromate cells.  
 Insulated wire, 1 lb. (2<sup>nd</sup> B. W. G.).  
 Muscle-weights, 1 set.  
 One Sphygmograph.  
 One Marey's tambour.  
 One Marey's cardiograph.  
 One Model of eye (dissectible).  
 One Phacoscope.  
 One Model of ear (dissectible).  
 One Spectroscope (straight vision).

—Approximate cost. Rs. 350

B.—B.A. OR B.SC. STANDARD

(a) *List of Apparatus, etc., for Practical Class of 12 Students*

*Additional requirements :—*

One Rocking Microtome.  
 Micrometers (eye-piece and stage).  
 Three Doremus Ureometers.  
 One Chemical Balance.  
 One Embedding bath (Hearson's).  
 Three Tetanus springs (graduated).  
 One Hypodermic syringe.  
 One Mercury Pump for gas analysis.  
 Two Desiccators.  
 Three Soxhlet apparatus with Liebig condenser.  
 One Centrifugal machine.  
 One Water bath (copper).  
 One Air Pump.

The following set of apparatus is required for every couple of students :

One Recording drum.  
 One Simple muscle-lever.  
 One Crank myograph.  
 One Simple stand.

One Du Bois Reymond's induction coil.  
 Two Electric keys.  
 One Pohl's commutator.  
 One Simple rheocord.  
 Two pairs of platinum electrodes.  
 One Bichromate cell.  
 One set of Muscle weights.  
 One Time Marker.  
 One Spectroscope (straight vision).  
 One Esbch's albuminometer.  
 One Urinometer.

—Approximate cost. Rs 2,750.

(b) *List of Apparatus, etc., for Lecture Purpose*

*Additional requirements :—*

One Kronecker's perfusion canula.  
 One Rabbit holder.  
 One Adjustable simple stand.  
 One Tuning fork (on stand) making 10 D. V. per second.  
 One Tetanus spring (graduated).  
 One Metronome.  
 One Deprez chronograph.  
 Two pairs of non-polarisable electrodes.  
 One pair of muscle forceps.  
 One Ophthalmoscope.  
 Two Electrodes (shielded) for deep nerves.  
 One Hill and Barnard's sphygmometer.  
 One Stromuhr (Ludwig's).  
 One Hurthle's membrane manometer.  
 One Ludwig's mercury manometer.  
 One Laryngoscope (with throat mirrors).  
 One Fleischip's haemometer.  
 One Oliver's haemocytometer.  
 One Oliver's haemoglobinometer.  
 One Moist chamber.  
 One Onkometer for kidney.  
 One Reflecting galvanometer.  
 One Shunt.  
 One Spring myograph.  
 One Spectroscope.  
 One Saccharimeter (polariscope).

—Approximate cost. Rs. 2,000.

C.—M.A. OR M.SC. STANDARD

*Practical Laboratory*

(a) <i>Histology :—</i>		Rs.
Approximate cost of equipment for 6 students	..	2,400
(b) <i>Chemical Physiology :—</i>		
Approximate cost of equipment for 6 students	..	1,800
(c) <i>Experimental Physiology :—</i>		
Approximate cost of equipment for 6 students	..	3,000
(d) <i>Galvanometer and Optical work :—</i>		
Approximate cost of equipment	.. ..	1,200



## BOTANY

## A.—INTERMEDIATE STANDARD

(a) *Collections and Wall Diagrams*

Collection of microscopic slides.  
 Botanical Wall Pictures (complete set).  
 Botanical models.  
 Physical Wall maps, Mercator's projection.  
 Physical Geography, Wall Map of India.  
 Collection of diapositives.

—Approximate cost, Rs. 750.

(b) *Lecture-room Apparatus*

Projection apparatus.  
 Screen.

—Approximate cost, Rs. 400.

(c) *List of Apparatus for Practical Class of 24 students<sup>1</sup>*

Microscopes, 1 doz.  
 Dissecting instruments.  
 Cork-borers.  
 Crucible tongs, 4 in number.  
 Hempel's desiccator, 2 in number.  
 Two doz. drop-bottles.  
 Canada Balsam bottle, 1 doz.  
 Glass tubing.  
 Glass rod.  
 Standard measures of different capacities.  
 Graduated measures.  
 2 Rules, 1 meter long.  
 Mortars and pestles.  
 Pipettes.  
 Air-pump plate.  
 Pressure tubing.  
 Flasks of different capacities.  
 Funnel of different sizes.  
 Burners.  
 Rubber tubing.  
 Test tube.  
 Test tube stands, holders, cleaners.  
 Thermometers.  
 Woulff's bottles.  
 Burettes.  
 Burette stands.  
 Three double bell-jars.  
 Stoppered bell-jars.  
 Beakers in nests.  
 Aspirators, 5 litres capacity, 3 in number.  
 Corks.  
 Maps, 1 doz.  
 Draining rack.  
 Pieces of cork sheet, weighted.  
 Glass capsules.  
 Camel-hair brushes.

Bell-jars for microscopes.  
 One Balance and weights.  
 Staining Troughs.  
 Glass bones.  
 Filter paper.  
 Arc-indicator.  
 Stains and chemicals.  
 Flower-pot (Rs. 20).

—Approximate cost, Rs. 2,400.

### B.—B.A. OR B.Sc. STANDARD

#### *List of Apparatus, etc., for Practical Class of 12 Students*

#### *I. Morphology and Histology (For Honours and Pass Students)—*

Compound Microscopes with 2 eyepieces and 2 objectives	12
Simple Microscopes (with 2 lenses)	.. .. 12
Paraffin embedding Oven	.. .. 1
Microtome with knife	.. .. 1
Hot Plate	.. .. 1
Camera Lucidas (Drawing oculars)	.. .. 3
Stage Micrometers	.. .. 3
Ocular Micrometers	.. .. 3
L moulds for casting paraffin blocks	.. .. 1

Necessary stains, reagents, glassware, models and charts.

Prepared slides showing stages in meiosis and mitosis, microsporogenesis, megasporogenesis, Structure of the embryo-sac, Pollengrain, Pollen tubes and fertilisation should be available for teaching and demonstration purposes.

#### *II. Plant Physiology (Pass Course)—*

Water Culture Jars	.. .. 7
Ganong's Potometer	.. .. 3
Apparatus for determining the amount of water absorbed and given off by transpiring plants	.. .. 3
Transpiration Balance	.. .. 1
Transpiration tubes graduated 15 c.c. in 1/10 divisions	.. .. 3
Direct vision Spectroscope	.. .. 2
Ganong's Respiroscope	.. .. 3
Zinc case with glass walls for observing geotropism	.. .. 1
Arc Auxograph	.. .. 1
Aspirator bottles	.. .. 3
Balance (Sensitivity up to 1/5 mg.)	.. .. 1
Cobalt chloride paper	
Clips (Pinch and screw)	.. .. 4 doz.
Clamps and stands	.. .. 2 doz.
Calcium chloride tubes	.. .. 1 doz.
Porous dishes for germination of seeds	.. .. 6
Black wooden boxes with windows of different coloured glasses, white, green, red, blue, yellow	.. .. One of each kind
Beakers	.. .. 4 doz.
Dessicators	.. .. 2
Bell-jars	.. .. 6
Thermometers	.. .. 3
Flasks	.. .. 4 doz.
Test tubes	.. .. 12 doz.
Potash Bulbs	.. .. 1 doz.
Soda lime towers	.. .. 6

U-tubes .. ..	1 doz.
Assorted rubber corks .. ..	12 doz.
Measuring cylinders .. ..	3
Glass tubing .. ..	10 lbs.
Glass cutting files .. ..	3
Pressure tubing .. ..	12 yds.
India rubber tubing .. ..	24 yds.
Filter pumps (glass ones) .. ..	3
Cork borers .. ..	2
Funnels .. ..	2 doz.
Glass with horns clay funnel, 4" diameter, to demonstrate the Hydro-tropion roots .. ..	3

*Additional Apparatus for Honours Classes for 12 Students*

Mercury manometer for measuring root pressure ..	3
Poroscope .. ..	3
Porometer .. ..	3
Apparatus for demonstrating the diffusion of gases with clay discs .. ..	3
Prefer's apparatus for showing the movement of gases in the plant .. ..	3
Blackman's apparatus for the study of gaseous exchange through upper and lower surfaces of leaves ..	2
Ganong's Photosynthometer .. ..	3
Gas collecting tubes .. ..	6
Kuhne's fermentation vessel .. ..	3
Moll's apparatus for experimenting on assimilation ..	3
Apparatus for demonstrating fermentation ..	3
Ganong's leaf area cutter .. ..	1
Ganong's light screen .. ..	3
Demonstration auxograph .. ..	1
Klinostat .. ..	1
Supply of necessary chemicals and reagents.	

*III. Systematic Botany—*

Living and preserved materials (dried or in fluid) of the groups prescribed. The supply of this material should be renewed from time to time.

Prepared slides of the prescribed types including their reproductive stages should be available for teaching and demonstration.

Collecting kit, such as plant presses, vascula, specimen tubes, Herbarium supplies, etc.

*IV. Ecology—*

Instruments for the determination of the various edaphic and climatic factors should be available for teaching and demonstration.

*V. Heredity and Evolution—*

Charts and models for illustrating the facts of evolution and heredity will be required for teaching and demonstration.

Approximate cost for obtaining Apparatus and Equipment for the B.A. and B.Sc. Standard (Pass and Honours) in Botany for a Class of 12 students :—

*I. Morphology and Histology—*

					Rs.
(a)	Microscopes .. ..	..	..	..	3,200
(b)	Models and Charts .. ..	..	..	..	300

	Rs.
II. Plant Physiology—	
(a) Pass Course .. .. .	600
(b) Additional for Honours Course .. .. .	500
III. Systematic Botany—	
(a) Slides, etc. (Anatomy) .. .. .	100
(b) Museum specimens, etc. .. .. .	300
(c) Collecting kit .. .. .	150
IV. Ecology—	
Apparatus .. .. .	200
V. Heredity and Evolution—	
Charts, etc. .. .. .	150

—Approximate cost, Total Rs. 5,500

### C.—M.A. OR M.Sc. STANDARD

#### *Practical Laboratory*

- (a) *Histological work* :—  
     Approximate cost of equipment of 6 students .. Rs. 2,400
- (b) *Experimental Plant Physiology* :—  
     Approximate cost of equipment of 6 students .. Rs. 3,000
- (c) *Bacteriological work* :—  
     Approximate cost of equipment of 6 students .. Rs. 600

## ZOOLOGY

### A.—INTERMEDIATE STANDARD

#### (a) *List of Apparatus for Practical Class of 20 Students*

Five Microscopes.  
 Dissecting instruments.  
 Twenty Troughs, fitted with cork, for dissecting small animals under water.  
 Twenty Dissecting trays.

—Approximate cost, Rs. 750.

#### (b) *List of Apparatus for Lecture Purpose*

Set of one hundred diagrams.  
 Skeleton of vertebrates (types).  
 Museum specimens of invertebrates.

—Approximate cost, Rs. 1,300.

### B.—B.A. OR B.Sc. STANDARD

#### (a) *List of Apparatus for Practical Class*

Microscopes, 1 doz.  
 Slides, etc.  
 Dissecting troughs.  
 Dissecting trays.

Dissecting instruments.  
One Rocking microtome.  
One embedding bath.  
One Hearson's incubator.

—Approximate cost, Rs. 1,700.

(b) *List of Appliances for Lecture Purpose*

*Additional requirements—*

One hundred diagrams.  
Skeletons and dissected specimens and models of vertebrates.  
Museum specimens of invertebrates.  
Microscopical specimens.

—Approximate cost, Rs. 3,000.

C.—M.A. OR M.SC. STANDARD

*Practical Laboratory*

	Rs.
(a) <i>Embryological and Histological work :—</i>	
Approximate cost of equipment for 6 students	.. 3,000
(b) <i>Dissecting work :—</i>	
Approximate cost of equipment for 6 students	.. 600

GEOLOGY

A.—INTERMEDIATE STANDARD

(a) *Maps :—*

Geological Wall Maps of India.  
Physical Wall Maps of Asia and Europe.  
Physical Wall Maps of the World.

—Approximate cost, Rs. 150.

(b) *Collections :—*

Collection of Minerals—Foote Mineral Company, Philadelphia, High School Collection of specimens No. 13A (or similar collection).

Collection of 102 glass crystal models according to Professor Baumhoner, Dr. Krantz Bonn (or similar collection).

Collection of 100 Rock specimens, according to Prof. Credner, 85 by 11 cm. with paste-board boxes in wooden case. Dr. Krantz Bonn (or similar collection).

Collection of corresponding Rock Sections. Dr. Krantz Bonn (or similar collection).

Collection of minerals illustrating physical properties. 100 minerals, 5 by 6 cm. in paste-board boxes in wooden case. Dr. Krantz Bonn collection No. 70 (or similar collection).

Collection of Geotectonic models, or wood, according to Prof. Kalkowsky. Dr. Krantz Bonn (or similar collection).

Collection of type fossils, 100 species.

Collection of Diapositive to illustrate General Geology, according to Prof. Van Calker. Dr. Krantz Bonn (or similar collection).

—Approximate cost, Rs. 1,300.

(c) *Lecture-room Apparatus :—*

Projection lantern.  
Demonstration Microscope.

—Approximate cost, Rs. 550.

**(d) Practical Class Apparatus :—**

Chemical balance with set of weights.  
 6 students' balances with weights.  
 Jolly's spring balance.  
 6 Pyknometers.  
 Blowpipe set with reagents.  
 2 Zeiss achromatic pocket lenses.  
 3 Scales of hardness.  
 Contact Goniometer.  
 Clinometer, Klockmann's model, manufactured by Fuess.  
 6 boxes of drawing instruments.  
 Swift's petrological microscope.

—Approximate cost, Rs. 1,200.

**B.—B.A. OR B.Sc. STANDARD****(a) Collections :—**

The collection specified for the Intermediate Course should be amplified and supplemented by the following :—

Blowpipe collection of 100 minerals.  
 Collection of section of minerals for the study of their special properties.  
 Collection of wooden crystal models.  
 Collection of diapositives illustrative of dynamic and structural geology.  
 Collection of specimens illustrative of dynamical, petrogenetic, and architectonic geology.

—Approximate cost, Rs. 2,500.

**(b) Lecture-room Apparatus :—**

Apparatus for use with the projection lantern for demonstration of interference phenomena, polarisation, double refraction, etc., with accessories.  
 Optical models illustrative of double refraction in crystals.

—Approximate cost, Rs. 800.

**(c) Practical Class Apparatus (in addition to that for the Intermediate Course) :—**

Four students' balances in cases (10 grammes size).  
 Four sets of gilt weights, fractional gramme weights of aluminium.  
 Open beam balance carrying 1,000 gr.  
 Set of weights, up to 1,000 grammes, nickelled.  
 Specific gravity bottles, 54 grammes with perforated stoppers.  
 Becker's specific gravity balance for liquids and solids.  
 Scales of hardness.  
 Zeiss achromatic pocket lenses, metal mounting,  $\times 6$  and  $\times 10$  (3 of each).  
 One additional contact goniometer.  
 One additional Swift's petrological microscope.  
 Reflexion goniometer.  
 Polarizing microscope.  
 Dichroscope.  
 Chemicals.  
 Chemical apparatus, for chemical mineralogy and geology.  
 Geological hammers, chisels, small rock-grinding apparatus.  
 Six blowpipe sets with reagents.

—Approximate cost, Rs. 2,000.

**C.—M.A. OR M.Sc. STANDARD**

No additional apparatus will be necessary for the standard.

## PSYCHOLOGY

## A.—B.A. OR B.Sc. STANDARD

*Models and Charts for Anatomical and Physiological Demonstration :—*

- Plastic Model showing the cerebral masses on one hemisphere and the nerve fibres on the other.
- Plastic model of cerebellum and spinal cord.
- Set of wax models (or collection of charts) showing the development of the foetal brain.
- Charts showing brain sections and stereoscopic views of the central nervous system.
- Chart showing development of brain from gymnotus to mammal.
- Plastic model of the eye, showing muscles, nerves, vessels, etc.
- Plastic model of the ear, showing the internal, middle and external ear.
- Charts showing the anatomy of nerves and sense-organs.
- Artificial eye.
- Phacoscope for demonstrating accommodation of lens.
- Ophthalmotrope demonstrating movements of the eye.

*Apparatus for experimental Study of Sensations :—*

- Olfactometer, with accessories.
- Harmonical.
- Tonometer.
- Tuning forks. Resonators.
- Quincke's tubes.
- Organ pipes.
- Sonometer.

*Apparatus for testing the Appreciation of Difference in Musical Pitch :—*

- Piston whistle.
- Savart's toothed wheel.
- Colour mixer with rotating discs.
- Champanimeter. Colour discs.
- Stereoscope with slides.
- Pseudoscope.
- Set of charts with optical illusions.
- Instrument for studying the muscle sensation and tactile space.
- Apparatus with electric contacts for studying the time sense.
- Sound hammer for experiments on time sense.

*Time Measurement of Mental Phenomena :—*

- Kymograph with accessories.
- Tambour with writing point.
- Time marker.
- Writing tuning forks.
- Vermer chronoscope (with accessories).
- Stop watch giving fifths of a second.
- Reaction time pendulum.
- Flash-light instrument with electric contact.
- Touch reaction instrument.
- Electric key.
- Chain-reaction instrument.
- Discs for chain-reaction instrument.

*Apparatus for studying Association, Attention, Discrimination, Memory, Will, etc. :—*

- Material for studies in association (photographs, etc.).
- Instrument for studies in association and memory.

Instantaneous shutter for association experiments.  
 Puzzle pictures.  
 Masson's discs.  
 Tachistoscope.  
 Psychodometer.  
 Ergograph.  
 Automatograph.

*Technical Outfit :—*

(a) *Optical and measuring instruments—*

Photometer.  
 Microscope.  
 Photographic camera.  
 Reading glasses.  
 Cardboard and gelatine paper of various colours.  
 Thermometer (finely graded).  
 Arometer, measuring tubes for liquids, pipettes, etc.  
 Mathematical Drawing Instruments.  
 Apothecary scale with weights.

(b) *Electric Apparatus—*

Leclanché's cells.  
 Grove cells.  
 Induction coil.  
 Electromagnet.  
 Galvanometer with mirror.  
 Electrodes, electrical connection and wires.

(c) *Miscellaneous—*

Surgical outfit (scissors, forceps, etc.).  
 Set of carpenter's tools.  
 Glass apparatus (tubes, rods, jars, funnels, etc.).  
 Metal stands and rods.  
 Rubber tubes, rubber bands, rubber atomisers, etc.  
 Brass and copper sheets, nails, screws, hooks, etc.  
 Drawing materials, paper, coloured papers, etc.  
 Smell and taste solutions.

B.—M.A. OR M.Sc. STANDARD

In addition to the apparatus required for the B.A. or B.Sc. standard, the following :—

*Models and Charts for Anatomical and Physiological Demonstrations :—*

Plastic model showing the course of the nerve-fibres throughout the encephalic mass.  
 Model showing the convolutions, the meridian section and the horizontal section.  
 Model of various heads showing the brain.  
 Model showing mechanism of the ear.

*Apparatus for experimental Study of Sensation :—*

Differential Sonometer.  
 Siren.  
 Electric bells.  
 Electric phonometer.  
 Instruments for successive contrast and irradiation.  
 Apparatus for diagnosing colour blindness.  
 Apparatus for appreciation of colour.  
 Micrometer shutter for studying minute fields of colour.



*Perception and Estimation of Spatial and Temporal Magnitudes :—*

Instrument for estimating angular divisions.

Mirror pseudoscopes.

Set of instruments for studying space in co-ordinated movements of both arms.

*Time Measurement of Mental Phenomena :—*

Chronoscope measuring the hundredth part of a second.

Machine for measuring reaction time by a falling rod.

Drop window for the sudden exposure of colours, numbers, etc.

Telegraph keys with sounder.

Reaction key with buttons.

*Association, Attention, Discrimination, Memory, Emotion, Will, etc. :—*

Instrument for studying the complication of perceptions.

Instrument for studying the movements during the emotions (by Elbs Freiburg).

Myograph Sphygmograph Pneumograph.

## GEOGRAPHY

## INTERMEDIATE STANDARD

*I.—Teaching and Demonstration***A. General :—**

Terrestrial Globe. Wall-maps (continents and principal political divisions). Magic Lantern with slides. Large atlas.

Stereoscope with slides illustrative of Descriptive Geography (principal countries of the world with interesting scenes and monuments).

**B. Special :—****(a) Mathematical (or Astronomical) Geography—**

An orrery. Diagrams and magic lantern slides illustrative of the solar system and its configuration, changes of the seasons, varying lengths of day and night- solar and lunar eclipses, phases of the moon tides.

Diagrams showing relative local time for principal cities.

Tables of latitude and longitude.

Stellar chart for identifying the pole star and chief circumpolar constellations.

**(b) Orographical and Hydrographical Wall-Maps for studying Distribution of Land and Water—**

Maps showing contour of the land and principal mountain systems, lines of drainage, water basins, river systems and deltas.

Relief map of India.

Ocean charts showing ocean depths and contour of the ocean floor, ocean currents with surface temperature; coral and other reefs, ocean deposits.

Maps of Arctic and Antarctic Regions.

**(c) Stratigraphical Charts and Diagrams—**

Diagrams explaining varieties of stratification section of a coal-field in Bengal.

Geological Survey map of India.

**(d) Botanical and Zoological Charts—**

Charts showing the distribution (1) of plants (2) of animals.

**(e) Ethnographical and Demographical Wall Maps showing the Distribution of Man and his Industries :—**

Anthropological charts showing the distribution of the Races of man. Stereoscopic and lantern slides showing chief racial types. Maps showing distribution of (1) mineral products, (2) vegetable products including food-stuffs (India).

Maps showing railway lines (India).

Maps showing ports and harbours—ocean highways.

**(f) Statistical Charts and Diagrams more especially with regard to India.****II. A Small Collection of the Chief Minerals and Economic Products of India****III.—Practical Course**

**A.—Cartography, drawing plans and maps, projections, orientation and determination of latitude, and modelling in sand and clay.**

*Two sets of the following appliances for a class of 20 students :—*

Drawing materials and instruments with special reference to Cartography.

Measuring Tape and Chain.

Mariner's Compass.

Magnetic Needle.

Spirit-level and Plumb line.

Clinometer.

Clay-modelling tool-palette knife.

Magnifying Lens.

**B. Meteorological observations.**

*One set of the following instruments for a class of 20 students :—*

Two ordinary thermometers.

Maximum and Minimum thermometers.

Thermometer screen.

Barometer (with vernier and thermometer).

Dry and wet bulb thermometer.

Hygrometric Tables.

Rain gauge.

Wind-direction. Compass-card and wind vane.

**C. Meteorological charts (with Meteorological tables, where necessary) for studies in atmospheric distribution—**

(a) Curves showing annual and diurnal ranges of temperature, and of pressure (for typical localities, including Calcutta and London).

(b) Isothermal lines, showing the mean temperature of the globe (1) for the year, (2) in January and (3) in July.

(c) Lines showing the mean barometrical pressure and the prevailing winds of the globe, (1) for January, (2) for July.

(d) Lines showing periodical winds (including the monsoon).

(e) Simple diagrams showing the direction of gyratory movements of the wind in the Northern and the Southern Hemispheres.

- (f) Weather charts, isobars, gradients, areas of depression and their shiftings, tracks of cyclones north and south of the lines.
- (g) Rainfall chart for the globe.  
Rainfall chart for India.  
Chart showing monthly rainfall for Calcutta and London.
- (h) Daily weather chart for Calcutta.

*Revised Note regarding the Syllabus for the Practical Course in Geography for the Intermediate Standard*

Hours of Practical Work—The same hours should be devoted to practical work as in the case of other science subjects such as Physics and Chemistry.

1. Reading of the following meteorological instruments on any four days, preferably in the months of July to September :—

- (a) Maximum and Minimum Thermometer.
- (b) Dry and Wet Bulb Thermometer.
- (c) Barometer.
- (d) Rain Gauge.

2. Plotting of Meteorological data.

Drawing of graphs from given data on

- (a) Rainfall.
- (b) Temperature.
- (c) Pressure.

3. Map projection.

Drawing an outline map of Africa or South America on Cylindrical equal area projection by graphical method.

Tracing of two outline maps of the World on Mercator and Mollweide projections and comparing their advantages.

4. Interpretation of the following maps as far as available or maps representing similar areas (scale 1"=1 mile).

- (i) Part of Burdwan, Bankura and Manbhum District—Index No. 73 1/14.
- (ii) Sundarbans—Index No. 79 G/5.
- (iii) Calcutta and adjoining parts.
- (iv) Parts of Sylhet and Khasi Hills.

5. Drawing of isobars and isotherms on outline maps of India from given data.

6. Showing the distribution of population on a map of Asia by shading and on a map of India by dot method.

7. Showing the distribution of crops and minerals on a map of India.

- 8. (a) Surveying a plot of land by chain.
- (b) Construction of scales and drawing of plan.

**B.A. AND B.SC. PASS STANDARD**

*List of Appliances and Maps required for affiliation in Geography up to the B.A. and B.Sc. Pass Standard \**

*I. Teaching and Demonstration*

In addition to the Intermediate standard :—

(a) Models illustrating evolution of land forms and drainage systems (may be supplied by the Geography Department, Calcutta University).

- (b) Slides—For Physical Geography .. 100
- For Regional Geography .. 200

(may be supplied by the Geography Department, Calcutta University).

- (c) Standard Wall Maps of important countries.
- (d) Epidiascope or Lantern.

II. *Practical Work*

In addition to the Intermediate Standard—

(a) Cartographical representation of meteorological and economic data : Daily and Monthly Weather charts published by the Meteorological Department, Alipore.

Aza printing set for duplicating maps—1.

Glass top table with lighting arrangements for—

Tracing maps—1 for 5 students.

Pentagraph—1 for 5 students.

Planimeter—1 for 5 students.

(b) Surveying :

Measuring chain, tape and ranging rod—1 set for 6 students.

Plane-table—1 set for 5 students.

Prismatic compass—1 set for 5 students.

(c) Topographical Maps :

Sets comprising one  $\frac{1}{4}$ ", one  $\frac{1}{2}$ " and one 1" maps—1 set for each student.

(d) Geological maps :

Sets comprising one map showing horizontal beds and one showing anticlines and synclines—1 set for each student (may be supplied by the Geography Department, Calcutta University).

(e) Rock-forming and economic minerals :

Sets comprising	..	{	Quartz—1
			Felspar—1
			Mica—1
			Hematite—1
			Salena—1
			Coal—1

(each measuring not less than 2"×2"×2"—1 set for 5 students.

(f) Chief types and rocks :

Sets comprising	..	{	Granite—1
			Basalt—1
			Sandstone—1
			Shale—1
			Limestone—1
			Conglomerate—1
			Gneiss—1
			Marble—1
			Quartzite—1

(each measuring not less than 6"×6"×6"—1 set for 5 students.

(g) Cereals and Fibres :

Sets comprising Wheat, Barley, Paddy, Jowar, Bazra, Maize and Sugarcane—1 set for 5 students.

Sets comprising Jute, Cotton, Hemp and Flax—1 set for 5 students

## CHEMISTRY

## A.—INTERMEDIATE STANDARD

*List of Apparatus for 20 students working in pairs*

	Quantity
Aspirator 10 litre capacity .. ..	2
Balance with agate knife edges and planes, graduated beam, beam support, thick glass vessel, double hook and polished mahogany stool for specific gravity experiments, to carry 250 gms. sensitive to 1 mg. .. ..	4
Analytical weights .001 to 100 gms. .. ..	4 sets)

	Quantity
Dispensing scales with weights .. ..	1
Basin evaporating Royal Berlin	
Porcelain with spout capacity 80 cc. ..	1 doz.
Ditto ditto ditto 100 cc. ..	2 doz.
Ditto ditto ditto 300 cc. ..	1 doz.
Sand bath deep, diam. 10 cm. ..	1 doz.
Steam bath (to be made locally) ..	
Beakers, Bohemian glass, without lip capacity 90 cc. ..	1 doz.
Ditto ditto ditto 140 cc. ..	2 doz.
Beakers, Jena glass, No. 2, capacity 500 cc. ..	1 doz.
Ditto ditto 6 capacity 150 cc. ..	1 doz.
Foot blower, size No. 3 ..	2
Extra rubber disc for No. 3 ..	4
Extra nets ..	
Blowpipe Universal with ball socket movement ..	
Mouth Blowpipe nickel-plated ..	1 doz.
Bottles, best Bohemian glass—	
N. M., without stopper, 150 cc. ..	6 doz.
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 60 cc. ..	6 doz.
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 150 cc. ..	1 gross
N. M., flat-stoppered, for reagents with carefully ground stoppers, capacity 250 cc. ..	2 gross
Bottles, W. M., flat-stoppered, capacity 60 cc. ..	6 doz.
Ditto ditto ditto 225 cc. ..	6 doz.
Woulff's bottles with two necks, one in centre and one on shoulder, capacity 250 cc. ..	2 doz.
Burettes with stop-cocks (c. form), lateral, normal calibrated 50 cc.—1-10 ..	1 doz.
Bunsen burner with air regulator, diam. 1 cm. ..	2 doz.
Star support for the above ..	1 doz.
Chimney, conical for the above ..	1 doz.
Blowpipe jet for the above ..	1 doz.
Bench light burners for bending glass tubes ..	6
Fletcher's safety, Bunsen, No. 10 ..	3
Cylindrical cans for boiling water, Condensors Liebig's inner tube fitted with I.R. cork, 40 c.m. ..	$\frac{1}{2}$ doz.
Connectors, double (for batteries) ..	2 doz.
Corks, finest quality, 23-25 mm. long, 2 mm. taper, diam. of top 16 mm. ..	6 doz.
Corks, finest quality 23-25 mm. long, 2 mm. taper, diam. of top 20 mm. ..	1 gross
Corks, finest quality, 32 mm. long head measure 30 mm. ..	1 gross
Ditto ditto ditto 40 mm. ..	4 doz.
Ditto ditto ditto 50 mm. ..	2 doz.
Corks, India Rubber, best quality, red —	
Size 1 diam. of bottom 13 mm. top 16 mm. ..	2 doz.
Size 3-A ditto 25 mm. top 29 mm. ..	2 doz.
Size 5 ditto 29 mm. top 35 mm. ..	2 doz.
Cork-borers, of brass tube with rod, nickel-plated, in sets of 3	1 doz. sets
Cork-borers, of brass tube with rod nickel-plated, in sets of 12	2 sets
Cork-pressures, cast iron, heavy 25 cm. long ..	2
Covers for beakers, concave (clock glass), diam. $7\frac{1}{2}$ cm. ..	2 doz.
Crucibles, Berlin porcelain, with cover, No. 0, 14 cc. ..	2 doz.
Crystallising dishes, flat bottom, with spout, 5 cm. deep, 10 cm. diam. ..	2 doz.
Desiccators, Scheibler's with ground glass cover, 15 cm. diam. of top ..	4

	Quantity
Desiccator discs, perforated circles of Berlin porcelain to fit above 11 cm. . . . .	4
Files, round, 13 cm. long, without handles . . . . .	1 doz.
Files, triangular, 13 cm. long, without handles . . . . .	1 doz.
Filter discs, perforated, Berlin porcelain, for use in funnels, true circular, 64 mm. diam. . . . .	4
Filter papers, Schleicher and Schull, cut circular, No. 595 for qualitative work, diam. 9 cm. . . . .	1,000
Filter papers, Schleicher and Schull, cut circular, No. 595 for qualitative work, diam. 11 cm. . . . .	1,000
Flasks, Bohemian, flat bottom, capacity 200 cc. . . . .	1 doz.
Ditto ditto ditto 500 cc. . . . .	2 doz.
Ditto round bottom ditto 200 cc. . . . .	1 doz.
Ditto ditto Jena glass, short neck. 500 cc. . . . .	1 doz.
Flasks with side tube from neck, straight 200 cc. . . . .	1 doz.
Flasks, Jena glass, conical, Erlenmeyer's, capacity 200 cc. . . . .	1 doz.
Measuring flasks, standard, gauged at one mark, stoppered neck, 250 cc. . . . .	1 doz.
Measuring flasks, standard, gauged at one mark, stoppered neck, 1,000 cc. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 6 cm. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 8 cm. . . . .	1 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, plain, diam. 19 cm. . . . .	4 doz.
Funnels, Bohemian glass, with ground edges, sides inclined at 60 degrees, ribbed, 8 cm. . . . .	6
Safety funnels with long tube for fitting up glass flasks, etc., thistle head, 32 cm. long . . . . .	1 doz.
Safety funnels, with long tube, etc., with bend and one bulb thistle, 30 cm. . . . .	$\frac{1}{2}$ doz.
Gas jars, cylindrical with ground flange, Bohemian glass, 21 $\times$ 4 cm. . . . .	1 doz.
Gas jars, cylindrical with ground flange, Bohemian glass, 32 $\times$ 5 cm. . . . .	1 doz.
Ground glass, discs, diam. 5 cm. . . . .	1 doz.
Ditto ditto 6 cm. . . . .	1 doz.
Graduated gas jar with spout on glass foot, scale descending, capacity 100 cc. . . . .	4
Graduated gas jar with spout on glass foot, scale descending, capacity 500 cc. . . . .	4
Kipp's apparatus, bulb 100 cm. diam. . . . .	3
Magnets . . . . .	2
Mortars and Pestles . . . . .	12
Ditto iron . . . . .	1
Pinch Cocks . . . . .	12
Pipettes, 5 cc. . . . .	12
,, 10 cc. . . . .	12
,, 25 cc. . . . .	12
Platinum foil, .01 mm. thick . . . . .	5 gms.
Platinum wire, 25 mm. . . . .	5 gms.
Pliers, steel . . . . .	2
Apparatus for showing diffusion . . . . .	1 set
Retorts, 70 cc. . . . .	1 doz.
,, 150 cc. . . . .	1 doz.
Retort stand . . . . .	12
Clamps for flasks . . . . .	12
Glass rods . . . . .	1 $\frac{1}{2}$ kgm

	Quantity
Boxwood rulers .. .. .	2
Deflagrating spoons .. .. .	12
Iron spoon for burning phosphorus .. .. .	6
Test tube, thin glass .. .. .	4 gross
Boiling tubes .. .. .	4 doz.
Test tube brushes .. .. .	12
Test tube stands .. .. .	12
Thermometers up to 200° C. .. .. .	6
Ditto 360° C. .. .. .	6
Crucible tongs .. .. .	1 doz.
Graduated tubes .. .. .	12
Pneumatic troughs .. .. .	1 doz.
Glass tubing .. .. .	3 kgm.
Hard glass tubing .. .. .	1 kgm.
Jena glass combustion tubes .. .. .	2 kgm.
I. R. tubing, best, int. diam. 4 mm. .. .. .	12 yds.
Ditto ditto 10 mm. .. .. .	24 yds.
Watch-glass .. .. .	2 doz.

*To be purchased locally*

Wire gauze, iron, 40 holes to an inch.

    "    "    copper, 40 holes to an inch.

Wire, iron

Wire, copper

Tripods .. .. . 1 doz.

CaCl<sub>2</sub> tubes .. .. . 1 doz.

—Approximate cost, Rs. 900.

Reagents for practical class of 20 students.

—Approximate minimum cost, Rs. 150 (one year's supply).

*List of Chemical Apparatus for Lecture Work, Intermediate Examination*

	Approximate quantity required.
Evaporating Basin of aluminium, fig. 3, strong, polished, pure 10 cm. diam. with spout .. .. .	1
Ditto of "R" resistance glass with spout, 70 mm. diam. .. .. .	6
Ditto Royal Berlin Porcelain with spout, glazed inside and out—	
No. 00 capacity 50 cc. .. .. .	6
" 1 " 100 cc. .. .. .	6
" 2 " 140 cc. .. .. .	6
" 4 " 200 cc. .. .. .	6
Ditto glazed inside and partially outside—	
No. 5 capacity 300 cc. .. .. .	3
" 6a " 535 cc. .. .. .	2
" 7 " 765 cc. .. .. .	2
Beakers, Bohemian glass, without spout—	
No. 0 capacity 50 ccm. .. .. .	6
" 1 " 90 ccm. .. .. .	6
" 2 " 140 ccm. .. .. .	6
" 3 " 200 ccm. .. .. .	6
" 4 " 325 ccm. .. .. .	6
" 9 2 litres capacity .. .. .	2

					Approximate quantity required.
Beakers of resistance, " R " glass, wide shape, with spout—					
No. 1	capacity	150 cc.	..	..	6
" 2	"	200 cc.	..	..	6
" 3	"	300 cc.	..	..	6
" 4	"	500 cc.	..	..	6
" 5	"	750 cc.	..	..	6
" 6	"	1,000 cc.	..	..	3
Covers for Beakers, gas jars, etc., ground one side glass circle—					
Diam.	5 cm.	..	..	..	3 doz.
"	7 cm.	..	..	..	3 doz.
"	10 cm.	..	..	..	3 doz.
Ditto with hole in centre—					
Diam.	7½ cm.	..	..	..	1 doz.
"	10 cm.	..	..	..	6 doz.
Ditto concave (clock glasses)—					
Diam.	6½ cm.	..	..	..	2 doz.
"	9 cm.	..	..	..	1 doz.
Tripods, with circular top and iron legs—					
Height	15 cm.	..	..	..	6
"	18 cm.	..	..	..	6
Sand bath dishes, shallow, stout, sheet iron, flat bottom,					
10 cm. diam.	..	..	..	..	3
Asbestos mill board, thickness of sheet 1/16 in., weight per sheet					
40" × 40", 4 lbs.	..	..	..	..	4 lbs.
Asbestos yarn 1/4" diam.	..	..	..	..	1 lb.
Batswing burner, height 30 cm.	..	..	..	..	2
Flat flame Bunsen burners, for bending glass and heating tubes					
length of opening at the mouth	15 cm.	..	..	..	1
Bunsen gas burner with air regulation	..	..	..	..	6
Rosetop for ditto ditto	..	..	..	..	3
Star support for chimneys	..	..	..	..	4
Iron chimneys, conical	..	..	..	..	4
Blowpipe jets	..	..	..	..	4
Teclu gas burner, large size	..	..	..	..	2
Head Fig. A, to fit ditto	..	..	..	..	2
" " B, to fit ditto	..	..	..	..	2
" " C, to fit ditto	..	..	..	..	2
Chimneys with clamping screw	..	..	..	..	2
Fletcher's safety Bunsen, No. 5	..	..	..	..	2
Spirit lamps with extra neck, capacity 20 cc.	..	..	..	..	6
Flasks, Bohemian, flat bottom					
Capacity	75 cm.	..	..	..	1 doz.
"	175 cm.	..	..	..	1 doz.
"	250 cm.	..	..	..	1 doz.
"	400 cm.	..	..	..	1 doz.
"	500 cm.	..	..	..	1 doz.
"	750 cm.	..	..	..	1 doz.
"	3 litres	..	..	..	4
Flasks, 500 cc.					
Flasks of " R " resistance glass—					6
Shape D, capacity	75 cc.	..	..	..	1 doz.
"	250 cc.	..	..	..	1 doz.
"	500 cc.	..	..	..	1 doz.
"	750 cc.	..	..	..	6
"	1,000 cc.	..	..	..	4



	Approximate quantity required.
Shape D, capacity 1,500 cc. .. ..	3
„ D, of extra hard glass for preparing Oxygen, round bottom—	
Capacity 150 cc. .. ..	1 doz.
„ 250 cc. .. ..	6
Flasks of “ R ” resistance glass, Erlenmeyer’s capacity 200 cc.	6
Bolt head flask, 3,000 cc. capacity .. ..	2
Retorts, stoppered, etc.—	
Capacity 150 cc. .. ..	1 doz.
„ 250 cc. .. ..	1 doz.
Receivers, with three necks, capacity 3 litres .. ..	2
Retorts without tubulure and stopper, capacity 250 cc. ..	6
Ditto ditto capacity 500 cc. .. ..	6
Retorts with tubulure for cork—	
Capacity 250 cc. .. ..	6
„ 500 cc. .. ..	3
Gas-generating apparatus, 40 cm. long .. ..	2
Gasholders, 25 litres capacity .. ..	1
Retort stands, 24 in. long .. ..	6
Clamp, of malleable iron .. ..	6
Liebig’s condenser, glass jacket and tube and length of body 60 cm. .. ..	6
Liebig’s condenser, glass jacket and tube and length of body 80 cm. .. ..	2
Condensation tube, U-tube, 30 cm. long .. ..	2
Condenser stand .. ..	2
Funnels, glass sides, inclines at 60, plain—	
Diam 5 cm. .. ..	1 doz.
„ 7½ cm. .. ..	1 doz.
„ 10 cm. .. ..	1 doz.
„ 15 cm. .. ..	3
„ ribbed, 10 cm. .. ..	6
Condenser with one tubulure and worm, length of jacket 25 cm. diam. 7½ .. ..	2
Funnels separatory, and—	
Capacity 60 .. ..	6
„ 100 .. ..	6
Glass tubing for bending, Nos. 2, 3 and 5 .. ..	4 kg.
Ditto No. 11 .. ..	5 kg.
Combustion tubing, best Bohemian, 5 to 10 mm. diam. Nos. 2 to 6, assorted .. ..	2 lb.
Jena combustion tube, 12 to 15 mm. outside diam. assorted	4 lb.
Glass cutting tools, set of 12, semi-circular .. ..	1 set
Set of glass blower’s tools .. ..	1 set
Files, round, 10 cm. long, without handle .. ..	6
Files, triangular, 10 cm. .. ..	3
Rasps, half round, 15 cm. .. ..	2
Flat files, 15 cm. .. ..	2
Corks, 23-25 mm. long. 2 mm. taper, diam. of stop 29 mm. ..	6 doz.
Corks, 32 mm. long. 2 mm. head measure 30 mm. ..	3 doz.
Corks, 32 mm. long. 2 mm. head measure 40 mm. ..	3 doz.
Corks, 32 mm. long. 2 mm. head measure 50 mm. ..	3 doz.
Corks, India rubber, red, size I, diam. of bottom 13 mm., top 16 mm. .. ..	2 doz.
Corks, 3a ditto 26 ditto 29 .. ..	2 doz.
Corks, 4 ditto 29 ditto 33 .. ..	2 doz.
Cork borers in sets of 12 .. ..	1 set

				Approximate quantity required.
Cork presser, wheel pattern	..	..	..	1
Cork borer sharpener for No. 983	..	..	..	1
<b>Tubing, best India rubber, red, int. diam.</b>	<b>4 mm.</b>	..	..	12 yds.
Ditto ditto ditto	10 cm.	..	..	12 yds.
Universal blowpipe	..	..	..	1
Footblower, size No. 3	..	..	..	1
Mouth blowpipe, nickel-plated	..	..	..	2
Platinum foil, 0.3 mm. thick, 100 sq., 1 cm., weighing 5 gms.	..	..	..	10 gms.
Platinum wire, 25 mm., diam. 1 metre	..	..	..	6 gms.
Steel hammers, 15 mm., square face	..	..	..	2
Anvils	..	..	..	2
Horseshoe magnets, 20 cm. long	..	..	..	1
Mortars and Pestles, diam. 8 cm.	..	..	..	3
Ditto ditto 15 cm.	..	..	..	2
Ditto, iron, bowlshape, diam. 5"	..	..	..	1
Forceps	..	..	..	2
Crucibles, Royal Berlin porcelain, with cover—				
No. 1, 25 cc.	..	..	..	3
No. 3, 80 cc.	..	..	..	3
Tongs, 15 cm. long	..	..	..	3
" for picking up mercury	..	..	..	1
" 61 cm. long	..	..	..	1
Spatulas, 15 cm. long	..	..	..	4
" 20 cm. "	..	..	..	2
Pliers, steel and 6" long	..	..	..	2
Scissors, 6 in. long	..	..	..	1 pair
Watchmaker's vice	..	..	..	1
Watch glass clips, diam. 10 mm.	..	..	..	2
Bottles, 125 cc. N. M. with stoppers	..	..	..	3 doz.
" 250 cc. do. do.	..	..	..	3 doz.
" 300 cc. do. do.	..	..	..	2 doz.
" 750 cc. do. do.	..	..	..	1 doz.
Bottle's cap 2 oz., N. M., with stoppers	..	..	..	3 doz.
Ditto 6 oz.	..	..	..	3 doz.
Ditto 12 oz.	..	..	..	2 doz.
Ditto 20 oz.	..	..	..	1 doz.
Bottle's W. M. flat-stoppered, cap 4 oz.	..	..	..	2 doz.
Ditto ditto ditto 8 oz.	..	..	..	2 doz.
Ditto ditto ditto 10 oz.	..	..	..	1 doz.
Specimen bottles, diam. 6 cm., int. diam. 4 cm.	..	..	..	2 doz.
Jars, cylindrical, etc., 15 cm. high	..	..	..	1 doz.
Ditto 4, etc., 20 cm.	..	..	..	1 doz.
Ditto 5, etc., 30 cm.	..	..	..	1 doz.
Ditto 6½, etc., 40 cm.	..	..	..	6
Jars, graduated, cap. 200 cc.	..	..	..	2
Gas jars, 500 cc. cap.	..	..	..	2
Bell-jars, cap, 2 litres	..	..	..	3
Deflagrating jars, 10 cm. diam.	..	..	..	2
Ditto globes, diam. 30 cm.	..	..	..	2
Detonating bottle	..	..	..	2
Balloons, collodion, cap. 800 cc.	..	..	..	1 doz.
Ditto ditto 1,500 cc.	..	..	..	6
Deflagrating spoons with brass cap	..	..	..	6
Iron spoons for burning P or S	..	..	..	4
Deflagrating stands	..	..	..	2
Pneumatic trough, length 36 cm.	..	..	..	1
" circular 16 cm. deep	..	..	..	1

	Approximate quantity required.
Beehive shelves, diam. 10 cm. . . . .	1
Pneumatic trough, porcelain, 18 cm. long . . . . .	1
"    trough, 50 cm. long . . . . .	1
Funnel, long neck, 30 cm. long . . . . .	1 doz.
Ditto ditto 46 ditto . . . . .	6
Funnel, safety, medium . . . . .	6
Kipp's apparatus, 1 litre cap . . . . .	4
Chloride of calcium tube, 20 cm. long . . . . .	6
U-shaped, length of limb 16 mm., diam. of limb 15 cm. . . . .	6
U-shaped, 15 cm. long—	
20 mm. diam. } . . . . .	6
15 cm. diam. }	
Chloride of calcium jars, height 25 cm. . . . .	6
Absorption tubes, Babo's . . . . .	2
Gas Washing bottle, cap. 150 cc. . . . .	6
Eudiometer, 40 cm. long . . . . .	2
Bunsen's gas voltmeter . . . . .	1
Gas tubes, sealed at one end, cap. 50 ccm. in 1/10 . . . . .	2
"    glass stop-cock at top 50 ccm. 1/5 . . . . .	2
Schroedter's apparatus . . . . .	1
Aspirators, 4 litres cap. . . . .	2
Set of four burners, etc. . . . .	1
Ramsay's tube heater with burner . . . . .	1
Erlenmeyer's combustion furnace (15 burners) . . . . .	1
Standard delivery pipettes—	
1 cc. . . . .	2
2 cc. . . . .	2
5 cc. . . . .	2
10 cc. . . . .	2
25 cc. . . . .	2
50 cc. . . . .	2
Standard flasks with one mark, 250 cc., with stopper . . . . .	2
Ditto ditto 500 cc. . . . .	2
With spout, 200 cc. . . . .	1
Normal burettes with stop-cock, 50 by 1/10 cc. . . . .	2
Ditto for pinch-cock, 50 by 1/10 cc. . . . .	2
Burette floats . . . . .	4
Burette stands, iron . . . . .	1
Burette clips, No. 3, 18 mm. . . . .	1 doz.
Specific gravity flasks, 25 gms. . . . .	2
"    tube, Sprengel's 10 gms. . . . .	2
Hydrometers	
Normal Thermometers from 0 to 100 . . . . .	3
Ditto ditto 0 to 360 . . . . .	2
Vacuum desiccator, inside diam. 14 cm. . . . .	1
Desiccators' Hempel's, diam. 10 cm. . . . .	1
Ditto Ditto 10 cm. . . . .	1
Brass syringe for exhausting and condensing, length of barrel, 13 cm. diam. 2½ cm. . . . .	1
Bell glass receiver int. height 20 cm., outside diam. 18 cm. . . . .	2
Davy's No. 4 Safety lamp . . . . .	1
Glass stop-cocks, bore 2 mm. . . . .	6
Test tube, int. diam. 1", 10 cm. long . . . . .	1 gross
Ditto, int. diam. ¾", 10 cm. . . . .	6 doz.
Ditto, 6" long, 1" diam. . . . .	3 doz.
Test tube holders, cork-lined, No. 1 . . . . .	2
Test tube of hardest combustion glass, 50 mm. by 10 mm. . . . .	2 doz.

	Approximate quantity required.
Test tube of hardest combustion glass, 75 mm. by 13 mm. ..	2 doz.
Test tube, int. diam. $\frac{1}{4}$ ", 10 cm. long ..	1 gross
Ditto int. diam. $\frac{3}{8}$ ", 10 cm. ..	6 doz.
Ditto 6" long. 1" diam. ..	3 doz.
Decomposition of water app. complete ..	1
Ozone apparatus (Siemens Brodie's or Newth's) ..	1
Grove's battery, etc., of set six ..	1 set
Connectors, double large, S. W. G. ..	1 doz.
Copper wire, silk covered, double ..	1 lb.
Induction coils, Ruhmkorff's, with Ruhmkorff's commutator length of spark 75 mm., No. 9 ..	1
Apparatus to determine the proportion by vol. elementary gases contained in one vol. of HCl with metal stand ..	1
Apparatus for vol. analysis for ammonia by chlorine and hypo- bromite of sodium ..	1
Apparatus for determination of volumetric composition of NH <sub>3</sub> by sparking ..	1
Apparatus to demonstrate that H and Cl combine to form HCl without alteration of vol. ..	1
Apparatus to show that HCl is produced by the combination of one vol. of H with one of Cl ..	1
Apparatus to prove that water contains two vols. of H and one of O (both limbs graduated) ..	1
Apparatus for the decomposition of HCl, carbon electrodes ..	1
Iron stand for the above ..	1
Apparatus to illustrate the effect of pressure and temperature on gases, complete ..	1
Apparatus to illustrate that when H and O combine to form water, the vol. measured at 100 is reduced by 1/3 ..	1
Iron Tripod for condenser ..	1
Stand ..	1
Apparatus for the decomposition of steam by sparking ..	1
Apparatus to show that O has the same vol. as the CO <sub>2</sub> and SO <sub>2</sub> produced from it ..	2
Stands for the above ..	2
Apparatus for producing Nitric peroxide from air ..	2
Apparatus to show the phenomena of diffusion complete with stand ..	1
Apparatus for obtaining equal vols. of Cl and H by electrolysis ..	1
Atomic weight chart ..	1
Woulff's bottles with two necks, 250 cap. ..	6
Ditto ditto 500 cap. ..	6
Apparatus for illustrating Boyle's Law ..	1
Cast iron bottles with screwed stopper for bursting when frozen	
Schleicher and Chüll's No. 595 Filter paper in sheets of 47 by 54 cm. ..	100
Ditto Circular No. 595 7 cm. ..	500
Ditto ditto ditto 9 cm. ..	500
Ditto ditto ditto 11 cm. ..	500
Ditto ditto ditto 24 cm. ..	250

Steam bath.

Air bath.

Sieves.

Iron wire gauze.

—Approximate cost, Rs. 1,300.

Reagents, etc., for Lecture room.

—Approximate cost, Rs. 200 (one year's supply).

## B.—B.A. OR B.Sc. STANDARD

(a) *Practical (in addition to the Intermediate Standard apparatus)*

	Approximate quantity required.
Basins of lead with round bottom with spout $7\frac{1}{2}$ cm. diam. ..	4
Air bath.	
Steam bath.	
Crucibles, fire clay, triangular .. .. .	12
Covers for above .. .. .	12
Crucibles and cover of platinum .. .. .	1
Flask, Bohemian, flat bottom, cap. 200 cc. .. .. .	6
Kjeldahl Flask, round bottom, long neck, cap. 300 cc. .. .. .	2
Conical flasks, 400 cc. .. .. .	1
Hot water funnels of copper with glass funnel .. .. .	2
Separating funnels .. .. .	2
Filter pumps .. .. .	2
Specific gravity flask with perforated stopper .. .. .	3
Pipe clay triangle .. .. .	12
$\text{CaCl}_2$ tube .. .. .	12
Barometer tubing .. .. .	1 kg.
Will and Varrentrap's bulbs .. .. .	2
Combustion furnace .. .. .	1
Platinum crucible .. .. .	1

—Approximate cost, Rs. 300.

Reagents for practical<sup>A</sup> class of 15 students.

—Approximate minimum cost, Rs. 350 (one year's supply).

(b) *List of Apparatus for Lecture Work (in addition to the Intermediate Standard)*

	Approximate quantity required.
Nickel basin, 10 cm. diam. weight 9 oz. (Troy) .. .. .	1
Platinum basin with spout, 70 cc. cap. .. .. .	1
Water bath, enamelled iron, with tripod stand, diam. 16 cm. .. .. .	1
Flasks, conical, Jena glass, Erlenmeyer's—	
Cap. 200 cc. .. .. .	6
" 300 cc. .. .. .	6
Distillation flasks, 100 cc. .. .. .	2
Ditto 250 cc. .. .. .	3
Ditto 500 cc. .. .. .	2
Fractional distillation tube with two bulbs .. .. .	1
Ditto 30 cm. long .. .. .	1
Ditto cap $1\frac{1}{4}$ litre .. .. .	3
Receivers with three necks, $11\frac{1}{2}$ litre .. .. .	3
Crucible and cover roses with gas leading tube .. .. .	3
Ditto of platinum, cap. 35 ccm. .. .. .	1
Crucible of copper with cover, diam. 8 cm. .. .. .	2
Crucible of copper with cover, diam. 12 cm. .. .. .	2
Pipe clay triangles .. .. .	1 doz.
Crucible, No. D. 10 cm. high .. .. .	2
Covers for the above .. .. .	2
Tongs, Nickel-plated, 20 cm. long .. .. .	4
" for picking up mercury .. .. .	1
Potash bulb, Geissler's .. .. .	2
Ditto Will and Varrentrap's .. .. .	2

	Approximate quantity required.
Kjeldahl flasks, 300 ccm. cap. .. ..	3
Pear-shaped glass heads with safety trap .. ..	2
Nitrometer, Schiff's .. ..	1
Carius Furnace .. ..	1
Cupels of bone ash 25 mm. diam. .. ..	3
Apparatus for superheated steam, length of body 80 cm. ..	1
Liebig's condensers, total length 105 cm. ..	2
Anschutz Thermometers, Nos. 1-5 .. ..	1 set
Beckmann's Thermometer, Range of Scale 6° in 1-100c C ..	1
Manometer .. ..	1
Standard Barometer .. ..	1
Dialysers, Bell-shaped glass, diam. 10 cm. ..	2
Dialysis paper 21½ .. ..	1 doz. sq.
Peffer's apparatus, cap. 150 cc. .. ..	1
Melting point apparatus .. ..	1
Apparatus for the preparation of acetylene from H and C ..	1
Acetylene gas apparatus .. ..	1
Vapour density bulbs, 400 cm. cap. .. ..	3
Dumas bath with holder .. ..	1
Vapour density apparatus, V. Meyer's .. ..	2
Small stoppered bottles .. ..	6
Outer bulb .. ..	2
Beckmann's depression of freezing point apparatus, complete set .. ..	1 set
Beckmann's boiling point apparatus, with boiling flask ..	1
Steam jacket, porcelain .. ..	
Thermometer -0--2000 for giving the temperature of the steam bath .. ..	1
Spiral condensers .. ..	1 set
Glass beads, etc. .. ..	1 set
Stand with clamp and boss .. ..	2 sets
Two Beckmann burners .. ..	1 set
Ring burner head for these .. ..	1 set
Landsberger's molecular weight determination apparatus ..	1 set
Thermo-regulator .. ..	1
Pocket Spectroscope, with comparison prism, illuminating mirror and adjustable slit .. ..	1
Spectrum tubes filled with Helium .. ..	1
Ditto ditto Argon .. ..	1
Solid formulæ models, etc. .. ..	1 set
Stand for the above .. ..	2
Models, etc., complete set of 12 rubber-fittings 48 coloured balls, etc. .. ..	1 set
Copper gauze, 19 holes to an inch .. ..	2 sq. ft.
Filter paper washed with HCl and HF for quantitative work	
No. 589 (2) White ribbon, 9 cm. .. ..	500
11 cm. .. ..	100
(3) Blue ribbon 9 cm. .. ..	100
11 cm. .. ..	100
(4) Yellow ribbon 9 cm. .. ..	200

—Approximate cost, Rs. 600.

Reagents, etc., for Lecture work.

—Approximate cost, Rs. 300 (one year's supply).

## C.—M.A. OR M.Sc. STANDARD

An additional supply of organic and rare inorganic substances will be necessary.

—Approximate minimum cost, Rs. 1,000.

## ANTHROPOLOGY

## A.—INTERMEDIATE STANDARD

(a) *List of Apparatus for a Practical Class of 25 Students*

One articulated skeleton.

Three sets of disarticulate bones.

Von Luchan's skin colour chart—1.

Martin's anthropometric set—1.

*Casts or photos or lantern slides of—*

Lemurs, Tarsius, Cercopithecus, Gibbon, Orang-utan, Chimpanzee, Gorilla and Pithecanthropus, Sinanthropus, Piltown, Neanderthal, Cro-Magnon.

*Slides or photos of the following physical types—*

Europe—Nordic, Mediterranean, Alpine.

Asia—Ainu, Japanese, Chinese, Tungus, Burmese, Malay, Andamanese, Vedda, Baluch, Afghan, Iranian, Armenoid, Arab, Jew.

India—Kadri, Gond, Santhal, Khasi, Naga, Lepcha, Toda and at least one example each from a high caste and from the other castes from each of the following areas:—South India, Maharashtra, Rajputana, Gujrat, the Punjab, U. P. and Behar, Bengal, Assam, Orissa.

Africa—Egyptians, Berbers, Nilotes, Bantu, Bushmen, Pygmies of Central Africa.

Oceania—Melanesians, Australian, Polynesians.

America—Esquimaux, Plains Indians, Mayan, Peruvian, Patagonian, Tierra del Fuegian.

Casts or actual specimens of at least a Palaeolith and a Neolith.

*Photographs or models illustrative of material culture—*

Habitations (Pile dwellings, thatched huts, tiled huts, Malabar tiled huts).

Dress of any tribe of Assam and of Chota Nagpur.

Agricultural implements—digging sticks, hoes, ploughs.

Fishing-traps and nets.

Hunting-bows and arrows, spears and boomerang.

Potter's wheel, and specimens of wheel-made and hand-made pottery.

Primitive oil-press and the ordinary Kolhu.

Photographs illustrating ceremonials at birth, initiation, marriage and death in Bengal as well as some common festivals in Bengal.

—Approximate cost, Rs. 550.

(b) *Lecture-room Apparatus*

Projection lantern—1.

Charts showing (1) Geological ages; (2) Evolution of Man.

Photographs, illustrative of the life of primitive hunters and fishers, pastoral people and crude agriculturists.

Maps of physical features of all the continents and India.

A few fossils.

—Approximate cost, Rs. 200.

*Specimens for Study of Primitive Peoples of India***I. Agricultural implements :—**

- A digging stick.
- A garden spade.
- A hoe.
- A plough.

**II. Fishing implements :—**

- A basket trap.
- An automatic trap.
- A fishing spear.
- A hand net.
- A cast net.
- A drag net.

**III. Weapons of war and chase :—**

- A club.
- A spear.
- Plain bow and pellet bow.
- Arrow.
- Bolt.

**B.—B.A. OR B.SC. STANDARD  
(Pass Course)**

**(a) List of Apparatus, etc., for a Practical Class of 12 Students**

*Additional requirements* (in addition to the I.Sc. laboratory equipment).

- Two Martin's Anthropometric sets.
- Fix-on Goniometer—1.
- Weighing Machine—1.
- Von Luschan's Skin colour scale.
- Eye colour scale—1.
- Hair colour scale—1.

***Casts or actual specimens of :—***

- Macacus or Semnopithecus.
- One of the anthropoid apes—Gibbon, Orang-outang, Chimpanzee or Gorilla.
- Casts of :—Pithecanthropus, Sinanthropus, Piltdown, Heidelberg, Neanderthal, Cro-Magnon.
- Casts and actual specimens of Stone implements :—Eoliths, Chellean, Acheulean, Mousterian, Aurignacian, Solutrean, Magdalenian, Azilian, Campignian, Neolithic.
- Casts or actual specimens or photos illustrative of Palaeolithic Art.

***Specimens or photos or slides illustrative of material culture :—***

- (A) *Agricultural implements* :—Digging stick, hoe, spade, pick, mattock, plough, roller, axe, harrow, rake, scythe and sickle, sowing instruments, threshing and cleaning appliances.
- (B) *Hunting accessories* :—Traps, baits, nets.
- (C) *Fishing appliances* :—Different types of nets and traps, dams and weirs, lines and tackle, spears and harpoons, etc.
- (D) Different types of weapons of offence and defence.
- (E) Different types of habitations.
- (F) Types of dress and adornment showing method of wearing, technique of weaving, materials used and socio-political and magico-religious significance.

—Approximate cost, Rs. 1,000.



(b) *List of Lecture-room Requirements*

Charts illustrative of :—

- (a) Man's place amongst the mammals.
- (b) Vertebrate evolution.
- (c) Anatomical peculiarities of fossil anthropoids and men.

Photographs illustrative of the life of the primitive tribes prescribed for study.

Maps (or books containing them) illustrating the distribution of ethnic types in Europe and India.

Photos or illustrated books containing representation of manners and customs of primitive peoples.

—Approximate cost, Rs. 500.

## BIOLOGY

*Requirements for Affiliation in Biology up to the Intermediate Standard*

			Rs.
(i)	Charts for Botany portion of Biology	.. ..	100
(ii)	Charts for Zoology portion of Biology	.. ..	200
(iii)	Specimens for Botany portion of Biology	.. ..	50
(iv)	Specimens for Zoology portion of Biology	.. ..	250
(v)	Museum show case .. ..	.. ..	200
(vi)	Models for Botany portion of Biology	.. ..	100
(vii)	Models for Zoology portion of Biology	.. ..	200
(viii)	Instruments for the teachers (for dissection, etc.)	.. ..	30
(ix)	Stains, Cover Glass, Slides for teachers	.. ..	50
(x)	Chemicals, reagents and preservatives	.. ..	50
(xi)	Books on Botany, Biology and Zoology	.. ..	1,250
(xii)	For a practical class of 20 students—		
(a)	Laboratory benches fitted up with sinks, taps and gas connections	.. ..	Rs. 1,000
(b)	10 Microscopes	.. ..	2,000
(c)	10 Mounted magnifying glasses	.. ..	50
(d)	20 Dissecting trays	.. ..	20
	Total	.. ..	5,550

Laboratory running expenditure .. Rs. 200 (per year).

*Requirements for Affiliation in Biology up to the Intermediate Standard for Colleges already affiliated in Botany*

(N.B.—The requirements are applicable only to such colleges as have the teaching staff in Botany, of sufficient strength for teaching Botany portion of Biology in addition to their duties as teachers of Botany. The practical class room of Botany should be available for conducting practical classes in Biology.)

			Rs.
(i)	Charts for Zoology portion of Biology	.. ..	200
(ii)	Specimens for Zoology portion of Biology	.. ..	250
(iii)	Museum show case .. ..	.. ..	200
(iv)	Instruments for the teacher (for dissection)	.. ..	30
(v)	Models for Zoology portion of Biology	.. ..	200
(vi)	Stains, cover slip and slides for the teacher	.. ..	50
(vii)	Chemicals and reagents for preservation, etc.	.. ..	50
(viii)	Books on Biology and Zoology	.. ..	750

## (iz) For a practical class of 20 students—

(a) Laboratory benches (practical class in Botany will serve the purpose).				
(b) 10 Microscopes (available from Botanical Laboratory).				
(c) Dissecting trays	..	..	..	20
			Total	1,750

Laboratory running expenditure .. Rs. 150 (per year).

*Requirements for Affiliation in Biology up to the Intermediate Standard for Colleges already affiliated in Zoology*

(N.B.—The requirements are applicable only to such colleges as have the teaching staff in Zoology, of sufficient strength for teaching Zoology portion of Biology in addition to their duties as teachers of Zoology. The practical class room of Zoology should be available for conducting classes in Biology.)

				Rs.
(i) Charts for Botany portion of Biology	..	..		100
(ii) Specimens for Botany portion of Biology	..	..		50
(iii) Museum show case	..	..		200
(iv) Models for Botany portion of Biology	..	..		100
(v) Stains, cover slips, slides for the teacher	..	..		50
(vi) Chemicals and Reagents	..	..		50
(vii) Books on Biology and Botany	..	..		750
(viii) For a practical class of 20 students—				
(a) Laboratory benches (practical class in Zoology will serve the purpose).				
(b) 10 Microscopes (available from the Zoological Laboratory).				
(c) 10 Mounted magnifying glasses	..	..		50
			Total	1,350

Laboratory running expenditure .. Rs. 150 (per year)

## APPENDIX C

### LIST OF APPLIANCES IN DIFFERENT SUBJECTS FOR THE MATRICULATION EXAMINATION

#### GEOGRAPHY

##### *List of Appliances for teaching Geography*

- (1) Clay, dry sand, paper pulp for modelling.
- (2) A Globe not less than 12 inches in diameter.
- (3) A Map of the School Locality and a Map of the area under the local Thana (these two maps may be prepared by the Geography teacher).
- (4) A Map of the District in which the school is situated (scale 1"= mile).
- (5) A Coloured Map of the Province.
- (6) A Coloured Political Map of India.
- (7) A Physical Map of India.
- (8) An Outline Map of India for map-building purpose (on a black cloth mounted on rollers).
- (9) A Map of the World on Mollweide's equal area projection.
- (10) A Political Map of each of the continents.
- (11) A good standard Atlas.
- (12) A Rain-gauge.
- (13) Geographical pictures.
- (14) A small collection of typical rocks, in particular, those of the Province and India.
- (15) A small collection of typical products of the Province and India.

N.B.—(a) Nos. 14 and 15 can be collected slowly with the help of the students and the teachers.

(b) Measuring tape, meter scale, foot-rule, squared paper, magnetic compass, thermometers and barometer have not been included in the list as these articles will be purchased by all schools in connection with equipping the class-room for teaching Elementary Scientific Knowledge.

The cost of articles Nos. 1 and 2 and 4 to 13 will be about Rs. 75.

The following additional equipment is recommended when it can be provided, but the lack of it is not to be considered as a bar to the recognition of the school—

- (1) A Relief Map of India.
- (2) A Physical Map of India (Johnston or Philip).
- (3) A Physical Map of each of the Continents (Johnston or Philip).
- (4) A Map of the World showing ocean-currents.
- (5) A Railway and Road Map of India (to be collected from Railway Time-tables).
- (6) Maps of India showing (i) Isotherms, (ii) Rainfall, (iii) Animals and (iv) Vegetation.
- (7) Charts explaining (i) tides and (ii) change of seasons.
- (8) Weather-cock or Windvane.

The articles mentioned in items Nos. (1) to (4) and (6) to (8) will cost about Rs. 100.

A Magic Lantern with slides will be useful. This will also be useful for the teaching of Elementary Scientific Knowledge.

## ELEMENTARY SCIENTIFIC KNOWLEDGE

*List of Apparatus required for teaching Elementary Scientific Knowledge in High Schools recognised by the University of Calcutta.*

## 1 and 2. Physiography.

(See the list of apparatus for teaching Geography in High Schools. A collection of rocks and minerals is essential.)

## 3. Elementary Botany and Biology—

				Approximate cost
				Rs. A. P
Morphological Charts.				
(1)	Chart showing different kinds of	Roots	.. 1	0 12 0
(2)	"	"	" Steams .. 1	0 12 0
(3)	"	"	" Leaves .. 1	0 12 0
(4)	"	"	" Flowers .. 1	0 12 0
(5)	"	"	" Fruits .. 1	0 12 0
(6)	Chart showing the different parts of	Rice Plant	1	0 12 0
(7)	Chart showing the different parts of	Pea Plant	1	0 12 0
(8)	Chart showing the life-history of	Ant	.. 1	0 12 0
(9)	"	"	Bee .. 1	0 12 0
(10)	"	"	Spider .. 1	0 12 0
(11)	"	"	Mosquito .. 1	0 12 0
(12)	"	"	Butterfly .. 1	0 12 0
(13)	"	"	Frog .. 1	0 12 0
(14)	Chart showing the anatomy of	Earth-worm	.. 1	2 0 0
(15)	Chart showing the life-history of	Fish	.. 1	2 0 0
Total				Rs. 13 12 0

*Note.*—Experiments on respiration, assimilation and transpiration of plants can be shown by apparatus suggested for Physics and Chemistry part of the Syllabus.

## 4. Elementary Anatomy and Physiology—

(1)	Chart showing the Skeleton System .. 1	13 4 0
(2)	" " the Muscular System .. 1	
(3)	" " the Circulatory System .. 1	
(4)	" " the Respiratory System .. 1	
(5)	" " the Digestive System .. 1	
(6)	" " the Nervous System .. 1	
(7)	" " the Structure of the Skin .. 1	

## 5 &amp; 6. Elementary Physics and Chemistry—

Ruler Boxwood, 1 metre long, 1/10th of an inch on one edge and mm. & cm. on the other	1 only	2 0 0
Measuring cylinders (one graduated in cub. in. and the other in c.c.)	2 "	3 0 0
Balance, all purposes, 250 gm. cap. with sp. gr. stool or extra short pan, sensitivity 3-4 mgrs.	1 "	30 0 0
Weight Box in hard wood box, 1 to 100 grms., with fractional weights	1 "	8 8 0
Level of Water. Apparatus to show, of glass, with 5 branches	1 "	2 12 0

				Approximate cost	
				Rs.	A. P.
Spouting cylinder to show liquid pressure at different depths	1	only		1	8 0
Apparatus to show Archimedes' Principle, Bucket and Cylinder	1	„		1	12 0
Glass Syringe .. .. .	1	„		0	4 0
Spirit Level .. .. .	1	„		1	8 0
Barometer Syphon, fitted with mercury .. .. .	1	„		30	0 0
{ Barometer Tubes .. .. .	2	„		2	0 0
{ Trough 2" diam. for the above .. .. .	2	„		0	8 0
{ Funnel (very small for the Barometer tube) .. .. .	2	„		0	6 0
{ Mercury .. .. .	1	lb.		3	0 0
Expansion, Cubical, Gravesand's Ball and Ring .. .. .	1	only		3	0 0
Wall Thermometer, double scale, Centigrade and Fahrenheit, of wood	1	„		1	2 0
Conduction of Solids (different metals)—Ingehausz's Apparatus	1	„		2	0 0
Ventilation Apparatus; Wooden box with two openings on top over which chimneys are placed (can be made to order)	1	„		3	0 0
Drawing Board to be covered with white paper (for Reflection and Refraction Expts.—can be made to order)	1	„		0	8 0
Drawing-Board Pins for the above .. .. .	6	„		0	6 0
Hair Pin with white knob .. .. .	1	doz.		0	2 0
Prism glass equilateral length 75 mm., sides 38 mm.	1	only		3	0 0
Slit of zinc sheet 4" sq. on stand .. .. .	1	„		2	0 0
Screen 6' x 4' of zinc on stand .. .. .	1	„		7	8 0
Lens, concave and convex (one each), with one wooden holder, Focal length 26 cm., diam. 50 mm.	1	set		5	0 0
Magnifier, triple power, in horn mount 30 mm. .. .. .	1	only		2	8 0
Candle-holder, adjustable .. .. .	1	„		1	8 0
Lodestone, small in paper box .. .. .	1	„		1	0 0
Magnet Bar 6" x 3/4 .. .. .	1	„		0	8 0
Horse-shoe magnet 2" .. .. .	1	„		0	6 0
Iron Filings .. .. .	1	lb.		0	2 0
Magnetic Needle 2", brass-centre on pivot on wooden base	1	only		0	12 0
Compass Needle .. .. .	1	„		0	8 0
Stirrup Suspender .. .. .	1	„		0	4 0
Knitting Needle, steel, for magnetisation .. .. .	1	doz.		0	6 0
Ebonite Rod 6' long .. .. .	2	only		1	0 0
Silk piece .. .. .	1	„		0	6 0
Flannel piece .. .. .	1	„		0	6 0
Simple Electric cell, made up of outer glass vessel and 2 plates, one of copper and another of zinc, with binding screws	1	set		2	0 0
Leclanche cell, porous pot, charged, zinc rod, 1 lb. ammon. chloride, complete with outer glass vessel	3	only		8	4 0
2 pints					
Electromagnet (with armature and connecting screws)	1	„		3	0 0
Electric Bell, 2" gong with push key .. .. .	1	„		1	8 0
Connecting wire D. C. C. No. 22 .. .. .	1	„		0	8 0
Apparatus to show Electrolysis of water .. .. .	1	„		10	0 0

			Approximate cost	Rs. A. P.
Torch, three-celled, with 3 cells .. ..	1 only		2 4 0	
Apparatus to show the heating effect of current, containing wooden base, copper, connector, binding screws and platinum wire 3', 0.19 mm. diam.	1 "		8 0 0	
Spirit Lamp, glass, complete with wick and holder, 120 c.c.	2 "		1 2 0	
Tripod, Iron, 15 cm. high, 4" top .. ..	2 "		1 0 0	
Wire gauge, iron, 20 mesh, 13 cm. sq. .. ..	3 "		0 3 0	
Retort stand, 20' rod with retort ring .. ..	1 set		1 12 0	
Clamp, retort with right-hand and left-hand screws ..	1 only		1 12 0	
Condenser Clamp, cheap .. ..	1 "		1 14 0	
Glass rod 3-6 mm. diam. .. ..	$\frac{1}{2}$ lb.		0 11 0	
Glass tubing, 3-7 mm. bore .. ..	1 lb.		1 5 0	
File (Triangular and Rat-tail, 1 each) .. ..	2 only		0 12 0	
I. R. tubing 5/16', 3/16" and 3/8" .. ..	4 ft. each		2 0 0	
Cork, velvet, assorted, 12, 14, 18, 21, 24 and 28 mm. diam.	$\frac{1}{2}$ gross		1 8 0	
Cork-borer, nickelled brass, without handle, but with rod, set of 6	1 only		2 0 0	
Test-tube, glass, 5" $\times$ $\frac{5}{8}$ " in card-board box ..	2 doz.		0 12 0	
Test-tube brush .. ..	3 only		0 3 0	
Test-tube stand, teakwood, 12 holes in 2 rows ..	1 "		0 8 0	
Test-tube, Lamp, blown kv-Boh. hard glass, 7' $\times$ $\frac{1}{2}$ "	3 "		1 0 0	
Beaker with spout (100, 200, 250 c.c., 1 each) ..	1 set		0 12 0	
Beaker without spout for boiling (100, 200, 250 c.c., one each)	1 "		0 12 0	
Flask R. B. (125, 250, 500 c.c., one each) ..	1 "		1 8 0	
Flask F.B. (125, 250, 500 c.c., one each) ..	1 "		1 0 0	
Evaporating Basin, S.C.P., porcelain, 10 cm. with spout	2 only		1 0 0	
Glass tumblers (medium size) .. ..	3 "		0 4 0	
Funnel Glass 7 $\frac{1}{2}$ ' cm. diam. .. ..	1 "		0 4 0	
" " 10 cm. diam. .. ..	1 "		0 4 0	
Pneumatic trough, 24 $\times$ 12 cm. .. ..	1 "		5 0 0	
Enamel Bowl .. ..	1 "		1 0 0	
Bell-jar with stopper 8" $\times$ 5" .. ..	1 "		2 12 0	
Gas jar with ground-glass cover (8" $\times$ 2") ..	3 "		3 0 0	
Beehive shelf .. ..	1 "		0 8 0	
Watch glass, 6 cm. diam. .. ..	2 pairs		0 13 0	
Condenser, Liebig's, I.R. joint 30 cm. .. ..	2 only		3 8 0	
Woulf's bottle, complete with thistle funnel, delivery tube and cork, 200 and 500 c.c., one each	2 "		6 0 0	
Deflagrating spoon .. ..	1 "		0 8 0	
Bottle, Reagent, W.M.S., 60 c.c. .. ..	6 "		1 2 0	
Bottle, Reagent, N.M.S., 125 c.c. .. ..	6 "		1 8 0	
Filter Paper, C.S. and S. No. 595, qualitative, 9 cm. diam.	1 pkt. (100 sheets)		0 7 6	
Litmus Paper (blue and red, one pkt. each) ..	2 pkts.		0 6 0	
Candle .. ..	2 only		0 2 0	
Magnesium ribbon, $\frac{1}{4}$ oz. in a phial .. ..	1 phial		0 8 0	
Sulphur Roll in tin .. ..	$\frac{1}{2}$ lb.		0 3 0	
Paraffin, hard .. ..	1 "		0 6 0	
Potass. Chlorate coml. in bottle .. ..	8 oz.		0 4 6	
Manganese dioxide 80 per cent in bottle ..	8 oz.		0 5 0	

				Approximate cost		
				Rs. A. P.		
Zinc granular in bottle	..	..	4 oz.	0	6	0
Alum Potash in bottle	..	..	4 oz.	0	5	0
Pot. Permanganate	..	..	2 oz.	0	4	0
Copper Sulphate pure, crystal, in bottle	..	..	4 oz.	0	8	0
Carbon Bisulphide, P.B.	..	..	1 lb.	1	6	0
Caustic Soda in bottle	..	..	$\frac{1}{2}$ lb.	0	7	0
Sodium carbonate	..	..	1 lb.	0	2	0
Sulphuric Acid coml. S. G. 1740 in a glass stopd. bottle	..	..	1 lb.	0	7	0
Hydrochloric Acid coml., S. G. 1145-50, in a glass-stopd. bottle	..	..	1 lb.	0	8	6
Nitric Acid Pure, S. G. 1380, in a glass stopd. bottle	..	..	1 lb.	0	7	6
Copper Turnings in bottle	..	..	8 oz.	0	5	0
Marble chips in tin	..	..	1 lb.	0	4	0
Lime in tin	..	..	1 lb.	0	2	0
Common Salt in bottle	..	..	4 oz.	0	3	0
Total Rs.				208	0	0

Each school may purchase the following additional apparatus :—

One Microscope or a Magic Lantern with slides	..	80	0	0
Dissecting tray	..	1	0	0
Scalpel, fine-point forceps and scissors with 6 pins	..	5	0	0
Primus stove with inclined burner for glass blowing, soldering, etc.	1 only	6	0	0
Rs.		92	0	0

Grand Total Rs. 300 0

## ELEMENTARY MECHANICS

### *List of Appliances for teaching Elementary Mechanics*

Foot-rule and a measuring tape.  
 Plumb-line and level.  
 Simple level (including brass slotted weight).  
 Roman Steelyard.  
 Lecture apparatus for experiment on moments.  
 Atwood's Machine.  
 Stop-watch.  
 Glazebrooke's Apparatus (to demonstrate movement of a body)  
 Hick's ballistic balance.  
 Compound wheel and axle.  
 Double pulley in one row.  
 4 single brass pulleys and 2 triple brass pulleys.  
 Weston differential pulley blocks with chain ( $\frac{1}{4}$  ton).  
 Inclined plane.  
 Parallelogram of Forces apparatus.  
 Resolution of Forces apparatus.  
 Wall Crane.  
 Physical Balance, with extra scale pan.  
 Set of gramme weights (200 grammes to 1 mgr.).

- 2 Composition ivory balls.
- Apparatus to show the path of projectile.
- Cardboard discs.
- Geometrical models of different shapes (including a cone).

*Note.*—The above list is not exhaustive, and much of it might be replaced by similar forms that could probably be made far more cheaply by any clever *mistry* under proper supervision. In most cases, however, it will probably be found advantageous to buy such a set as indicated in the list specially for demonstrating purposes, *at a cost of about Rs. 400* and subsequently to develop simplified duplicates illustrating the same principles which the boys should be given opportunity actually to experiment with, on their own individual account or working in pairs.

### ELEMENTARY HYGIENE

*The schools which apply for recognition in Hygiene are required to provide the following Appliances :*

#### A. CHARTS

1. A. L. Physiology and Hygiene charts, complete set.
2. A thermometric chart showing normal scale of effective temperatures.
3. Common intestinal parasites.
4. Common bacilli.
5. Deep-well, shallow-well, tube-well.
6. Reserved tank.
7. Vitamin contents of common food-stuffs.
8. Code of sportsmanship.
9. Different types of Mosquitoes (Anopheles, Culex, Stogomiya).  
Different varieties of Flies (house fly, stable fly, blue-bottle).
10. Fleas (common flea, rat flea, sand flea), Lice (head, body and crab).
11. Life-history of a mosquito.
12. Life-history of a house-fly.
13. List of health practices.
14. Different types of exercise and their effects upon the body.
15. Different types of postures.
16. Different provisions for ventilation.
17. Slow sand-filter.
18. Private latrine; pit latrine; bore-hole latrine; night-soil cart.
19. Complete system of house drainage.
20. Section of percolating sewage filter (balanced filter).
21. Septic tank.
22. Black-board cloth on rollers for recording changes in height and weight of students.

#### B. APPARATUS

- \*1. Students' microscope.
- \*2. Bell-jars—2.
- \*3. Glass Plates—2.
- \*4. Dish Plates—2.
5. Glass Tube.
6. Mirror.
7. Candles.



8. Lengths of wire.
9. Slides.
10. Cover slips.
11. A pair of compasses.
12. A foot-rule marked in mm.
- \*13. A stop-watch.
14. Mounted needles—2.
- \*15. Beakers—3, 250 c.c.
16. A metal ring.
- \*17. A set of six test-tubes—4.
- \*18. Test-tube stand—1.
- \*19. Test-tube holders—2.
20. Water-bath—6 ft.
21. Pieces of rubber.
22. A rubber tube—4 ft.
23. Glass beads—12.
24. Spirit lamp.
25. Spirit stove.
26. A weighing machine.
27. A height-measuring rod.
28. A steel tape.
- \*29. A dry-bulb thermometer. } Preferably Fahrenheit.
- \*30. A wet-bulb thermometer. }
- \*31. A chemical thermometer, Centigrado.
32. A clinical thermometer.
- \*33. A mercurial barometer.
- \*34. A lactometer.
- \*35. Liebig's condenser with accessories.
36. Glass funnel.

#### C. CHEMICALS, ETC.

- \*1. Lime water—1 lb.
- \*2. Absolute Alcohol—4 oz.
- \*3. Xylol—1 oz.
4. Vaseline—1 lb.
5. Boric Cotton—4 oz.
6. Starch—1 oz.
7. Pepsin—1 oz.
8. Gelatin—1 oz.
9. Iodine, Sol.—2 oz.
10. Benedict's Solution, or Fehling's Solution—2 oz.
- \*11. Acid Hydrochlor, Dil.—2 oz.
- \*12. Litmus paper, red and blue (4 packets).
13. Sugar.
- \*14. Filter paper.
15. Alum.

*Note.*—Apparatus and chemicals marked with asterisks will also be required for the purpose of teaching Elementary Scientific Knowledge as a compulsory subject. They need not be purchased twice over separately.

#### D. SPECIMENS

##### (a) Food.

- (i) Different kinds of rice.
- (ii) Different kinds of dal (pulses).
- (iii) Different kinds of other cereals—Wheat, Barley, Indian Corn, Indian Oats, Jawar, etc.

- (iv) Different kinds of sugar.
- (v) Different oil-producing substances—linseed, mustard seed, cocoanut, groundnut, sorgoja, mohua seeds, til, etc.

(b) Antiseptics or Disinfectants.

- (i) Bleaching powder.
- (ii) Permanganate of potassium.
- (iii) Sulphur.
- (iv) Phenyle.
- (v) Soap, common and carbolic.

*Probable amount of Expenses for procuring Appliances necessary for recognition in Elementary Hygiene*

	Rs.
I. Apparatus (this includes cost of apparatus which will also be required for compulsory classes in Elementary Scientific Knowledge to the extent of nearly Rs. 125)	250
II. Specimens (approx.) .. .. .	10
III. Charts—	
(a) A. L. Physiology and Hygiene charts, complete set—Rs. 12-8-0	105
(b) Black-board cloth on roller—Rs. 2-8	
* (c) 20 charts at an approx. cost of Rs. 4-8-0 each—Rs. 90.	
IV. Chemicals (recurring) .. .. .	5 to 10
Total ..	375
Less Rs. 125 required for compulsory class in Elementary Scientific Knowledge .. .. .	125
	250

## BUSINESS METHOD AND CORRESPONDENCE

*List of Appliances for teaching Business Method and Correspondence*

1. Facsimiles of principal commercial instruments.
2. Specimen pages of principal books used in a modern office.
3. Small model of a filing cabinet with card index.
4. Small model of a duplicating machine and of an addressograph.
5. Organisation charts for (a) offices and (b) factories.
6. Postal Guide.
7. Any Good Directory, e.g., Thacker's.

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\* Some of the charts may be prepared by the schools locally at a considerably reduced cost.

8. Any good Commercial Code, *e.g.*, Bentley's.
9. Telephone Directory.
10. Also books on Business Methods and Correspondence and Allied subjects to the value of Rs. 60 in the School Library.

Total cost Rs. 300 (approximate).

## COMMERCIAL GEOGRAPHY

### *List of Appliances for teaching Commercial Geography*

	Approximate cost Rs. A. P.
One Terrestrial Globe, not less than 8" in diameter, with meridians	17 8 0
A Commercial Map of the world such as Philip's New Mercantile Map of the World (Mercator's Projection).	12 0 0
Any good commercial Atlas such as Philip's Chamber of Commerce Atlas	17 0 0
Geographical pictures such as Black's Geography Pictures	8 0 0
Crop Atlas of India (Govt. of India) .. ..	4 0 0
Historical Atlas of India, such as that published by Messrs. Longmans, Green and Co.	1 0 0
Economic Wall Maps of India, showing Railways and Canals	3 0 0
Map of India showing Industries .. ..	3 0 0
Populations .. ..	3 0 0
Civil Divisions .. ..	3 0 0
Rainfall and Temperature .. ..	3 0 0
Forests .. ..	3 0 0
Minerals .. ..	3 0 0
Agriculture .. ..	3 0 0
A small commercial museum containing chief minerals and economic products of India with suitable statistical charts and diagrams	16 8 0
Books and Atlases on general and commercial geography in the school library.	50 0 0
Total cost Rs.	150 0 0

## ELEMENTS OF PHYSICS AND CHEMISTRY

### *List of Appliances for teaching Elementary Physics and Chemistry*

(Appliances in this list are in addition to those required for teaching Elementary Scientific Knowledge.)

#### 1. *Elements of Physics*

	Approximate cost Rs. A. P.
Ruler, Boxwood, 1 metre long, 10ths of an inch on one edge and cm. and mm. on the other 1 only	2 0 0
Protractor, Wooden .. .. 1 "	1 2 0

			Approximate cost		
			Rs.	A.	P.
Set of 6 Hard Wood Blocks, 1½" high, comprising Cone, Cube, Sphere, Pyramid, Cylinder and Prism	1 set		1	8	0
Measuring Cylinder, glass, one graduated in cubic inches and the other in cubic centimetres	2 only		3	0	0
Spring Balance, reading in grms. up to 50 grms.	1	"	1	14	0
Air Pump with plate of 6" diam.	1	"	35	0	0
Thermometers (one having Centigrade scale from 0° to 110° and the other, Fahrenheit scale from 0° to 220°)	2	"	2	0	0
Apparatus for showing convection of heat in water in a glass rectangle with funnel	1	"	1	8	0
Ritchie's Apparatus for showing absorption and radiation of heat	1	"	12	0	0
Calorimeter, Schuster and Lees'	1	"	4	0	0
Tuning Fork, simple C. A. G.	1 each	"	4	8	0
Resonance Apparatus; glass jar and glass tube with metal stand	1 only	"	10	0	0
Electric Bell in Bell-jar	1	"	6	12	0
Rectilinear Propagation of Light Apparatus with triple candle holder and two screens	1	"	4	0	0
Photometer, Bunsen's	1	"	3	4	0
Angular mirrors, two hinged together, mounted on wooden base with paper scale	1	"	2	4	0
Student's Optical Bench with accessories	1	"	6	12	0
Concave Mirror, optically true, diam. 2"	1	"	2	2	0
Convex Mirror, optically true, diam. 2"	1	"	2	2	0
Muller's Semi-circular tray, for Reflection, made of japanned tin with revolving mirror, indicator and divided circle; diam. 18"	1	"	2	12	0
Refraction of Light, glass slab to show, polished on all sides	2	"	4	8	0
Prism, glass, equilateral length 75 mm., face 38 mm.	2	"	6	0	0
Drawing Board for Refraction experiment	1	"	1	0	0
Lens, double convex, diam. 50 mm. focal length 26 cm.	1	"	2	2	0
Lens, double concave, diam. 50 mm., focal length 26 cm.	1	"	2	2	0
Bar Magnet, 4" long	1 pair	"	1	12	0
Glass, Ebonite, Sealing wax and Sulphur Rod, 1 each	4 only	"	4	0	0
Flannel for rubbing	1 piece	"	0	8	0
Silk for rubbing	1	"	0	8	0
Catskin for rubbing	1	"	1	0	0
Pith Balls, in box	1 doz.	"	0	2	0
Pith Ball Pendulum	1 only	"	0	6	0
Electroscope, Gold leaf	1	"	4	0	0
Induction cylinder; brass cylinder mounted on an insulated stand, with mounted pith balls	1	"	5	8	0
Electrophorus: ebonite base with glass handle fixed to brass cover, 4 diam.	1	"	5	0	0
Daniell's cell, complete with outer copper cell, porous pot, zinc rod, 1 lb. copper sulphate, 1 pint capacity	1	"	4	8	0
Dilute Sulphuric Acid	2 lbs.	"	8	0	0
Galvanoscope, horizontal, paper scale and coil of about 20 turns of insulated wire, with terminals.	1 only	"	3	8	0
Demonstration Telegraph Apparatus	1 set	"	50	0	0

N.B.—If possible a set of small Telephone Apparatus may be purchased at a cost of about Rs. 50.

Approximate  
cost

Rs. A. P.

2. *Elements of Chemistry*

Test tubes, glass, 5" × $\frac{3}{4}$ "	..	..	$\frac{1}{2}$ gross only	2	3	0
Test tubes, Pyrex combustion glass 6" × $\frac{3}{4}$ "	..	..	3 only	1	8	0
Test tube holder, flat brass with slider	..	..	2 "	0	6	0
Crucible tongs, brass, 8"	..	..	1 "	0	8	0
Pneumatic trough, enamelled metal, with side shelf and movable beehive shelf (14" × 8" × 6")	..	..	1 "	2	0	0
Test tube stand, teak wood, 12 holes in 2 rows	..	..	1 "	0	8	0
Beaker with or without spout, hard glass (100, 150, 250 c.c., 1 each)	..	..	3 "	2	0	0
Flask, flat bottom, hard glass (100, 250, 500 c.c., one each)	..	..	3 "	2	0	0
Flask, round bottom, hard glass (100, 250 cc., one each)	..	..	2 "	1	2	0
Evaporating Basin, Porcelain, 8 cm. with spout	..	..	2 "	0	12	0
Glass tubing, 3—7 mm. bore	..	..	1 lb.	1	5	0
Mortar and Pestle, Porcelain, with spout	..	..	1 only	0	10	0
Sulphur Roll (Pkt.)	..	..	1 lb.	0	3	0
Iron Filings (Pkt.)	..	..	1 lb.	0	4	0
Potassium Nitrate coml. (Pkt.)	..	..	2 lbs.	0	6	0
Sodium Chloride cryst., P. B.	..	..	$\frac{1}{2}$ lb.	0	4	0
Sugar cryst.	..	..	$\frac{1}{2}$ "	0	2	0
Iodine, P. B.	..	..	1 oz.	0	9	0
Carbon Bisulphide	..	..	4 "	0	10	0
Potassium Iodide cryst.	..	..	2 "	0	14	0
Rectified spirit	..	..	4 "	1	8	0
Ether Sulphuric, P. B.	..	..	2 "	0	8	0
Alum Potas. Extra Pure Cryst.	..	..	4 "	0	8	0
Camphor (in tin)	..	..	1 "	0	4	0
Boric Acid	..	..	$\frac{1}{2}$ lb.	0	4	0
Graphite Powder (Pkt.)	..	..	2 oz.	0	4	0
Charcoal, Animal (Pkt.)	..	..	4 "	0	8	0
Sodium Metal	..	..	2 "	0	12	0
Phosphorus, Yellow Sticks	..	..	2 "	0	14	0
Copper Sulphate (Pkt.)	..	..	2 lbs.	0	8	0
Potas. Chloride coml. in bottle	..	..	8 oz.	0	4	0
Mangarese dioxide in bottle	..	..	8 "	0	5	0
Ammonium Chloride (Pkt.)	..	..	1 lb.	0	4	0
Iron Ore, Magnetic	..	..	4 oz.	9	0	0
Rods of Cast iron, Steel and Wrought iron, 12" one each	..	..	3 only	0	8	0
Iron Oxide Black (Ferrous)	..	..	2 oz.	0	8	0
Iron Oxide Red (Ferric)	..	..	2 "	0	8	0
Iron Chloride Dry (Ferrous)	..	..	2 "	0	8	0
Iron Chloride Dry (Ferric)	..	..	2 "	0	8	0
Iron Sulphate (Ferric)	..	..	2 "	0	8	0
Iron Sulphate (Ferrous)	..	..	1 lb.	0	2	0
Iron Sulphide	..	..	1 "	0	4	0
Magnesium Ribbon (Pkt.)	..	..	12 gms.	0	12	0
Platinum Wire, 4"	..	..	1 piece	2	8	0
Magnesium Carbonate coml.	..	..	1 lb.	0	2	0
Magnesium Chloride Lump	..	..	1 "	0	6	0
Magnesium Sulphate	..	..	1 "	2	0	0
Cinnabar	..	..	2 oz.	2	9	0

				Approximate cost	Rs. A. P.		
Mercuric Oxide Red	..	..	2 oz.	1	0	0	
Mercurous Chloride (Calomel)	..	..	2 "	0	10	0	
Mercuric Chloride (Corrosive Sublimate)	..	..	2 "	0	11	0	
Mercuric Sulphide, Red Powder	..	..	2 "	1	0	0	
Zinc Blende	..	..	4 "	0	10	0	
Zinc Metal, Granular (Pkt.)	..	..	1 lb.	0	5	0	
Zinc Oxide (Pkt.)	..	..	1 "	0	4	0	
Zinc Chloride Lump	..	..	1 "	0	8	0	
Zinc Sulphate	..	..	2 lbs.	1	8	0	
Zinc Carbonate coml. (Pkt.)	..	..	$\frac{1}{2}$ lb.	0	8	0	
Zinc Sulphide	..	..	4 oz.	1	0	0	
Ammonium Chloride (Pkt.)	..	..	1 lb.	0	4	0	
Potassium Nitrite	..	..	$\frac{1}{2}$ "	0	13	0	
Acid Nitric coml.	..	..	1 "	1	0	0	
Acid Hydrochloric coml.	..	..	1 "	0	7	0	
Acid Sulphuric coml.	..	..	1 "	0	5	0	
Caustic Soda Flakes	..	..	1 "	0	7	0	
Caustic Potash Flakes	..	..	1 "	0	9	0	
Total				250	0	0	

*N.B.*—(i) Each school should provide a minimum sum of Rs. 30 per annum as recurring expenditure for Apparatus and Chemicals.

(ii) Each school should, if possible, provide the following apparatus at a cost of about Rs. 10 :—

- One Measuring flask, 250 c.c.
- One separating funnel, 250 c.c.
- One graduated pipette, 10 c.c. or 5 c.c.
- One burette, 50 c.c.

The above articles, *viz.*, (a), (b), (c) and (d) can be purchased in the first or second year from the allotment of Rs. 30 mentioned above.

## MENSURATION AND SURVEYING

### *List of Appliances for teaching Mensuration and Surveying*

				Approximate cost	Rs. A. P.		
1 Instrument box containing 1 pair divider,	compass						
with plain, pencil and ink points.							
1 pencil bow compass,	drawing						
pen, 1 protractor and 1 parallel ruler.							
Best quality Electrum	..	..	35	0	0		
1 pair set-squares (transparent 6' -45° and 8' -60°)	..	..	1	8	0	(per pair)	
1 box of plotting scales 10 to 60 with offsets	..	..	16	0	0		
1 Measuring chain 100' with 10 arrows	..	..	5	8	0		
1 Cross staff or optical square	..	..	3	8	0		
1 Metallic tape 50'	..	..	5	0	0		
6 Flags of light bamboos shod with iron	..	..	0	8	0	(each)	
Field books (number as necessary)	..	..	9	0	0	(per doz.)	
Total				80	0	0	

## ELEMENTS OF BIOLOGY

*List of Appliances for teaching Biology*

	Approximate cost
	Rs.
One Compound Microscope .. .. .	120
Two Dissecting lenses on stand .. .. .	10
20 Dissecting dishes with paraffin .. .. .	20
Charts .. .. .	50
Preservative fluid .. .. .	5
Glasswares to keep specimens .. .. .	20
Total .. .. .	225

## SEWING AND NEEDLEWORK

*List of Appliances for teaching Sewing and Needlework*

	Approximate cost
	Rs. A. P
1. A sewing machine .. .. .	130 0 0
2. Different kinds of books and current publications on embroidery, crochet, drawn thread, knitting, net-work, cross-stitch, cutting and pattern making	50 0 0
3. One big and one small scissors .. .. .	5 0 0
<i>Prepared works.</i>	
A.	
(1) A child's frock (6-20 years)—any light-coloured cotton cloth—2 yds.	As. 8 per yd. 1 0 0
A petticoat (bodice and princess style) Long cloth—2 yds.	„ 5 per yd. 0 10 0
(2) A child's overall, cut and embroidered —Any light-coloured cotton cloth— 2 yds.	„ 8 per yd. 1 0 0
Silk thread 2 Skeins .. .. .	A. 1 per skein 0 2 0
(3) A Magyar bodice—Long cloth $\frac{3}{4}$ yd.	As. 8 per yd. 0 6 0
A blouse—Any light-coloured cotton cloth 1 yd.	„ 8 per yd. 0 8 0
A petticoat—Long cloth $1\frac{1}{2}$ yds. .. .. .	„ 5 per yd. 0 7 6
(4) A Shirt—Long cloth $1\frac{1}{2}$ yds. .. .. .	„ 5 per yd. 0 7 6
(5) A knitted suit for a child (including cap)	
* Wool 8 oz.	Rs. 4-8 per lb. 2 4 0
Buttons (big) 6	As. 6 per dozen 0 3 0
Buttons (small) 4	„ 3 per dozen 0 1 6
Knitting needles 4	„ 12 a pair 1 8 0
(6) A pair of knitted socks on 4 needles	
Steel needles	As. 8 0 8 0
Wool 2 oz.	Rs. 4-8 per lb. 0 9 0

\* (Vide Syndicate, dated the 18th September, 1942, item No. 9.)

Approximate  
cost  
Rs. A. P

- (7) *A patch in a garment made of cotton, silk and flannel.*

Old garment and pieces of flannel, silk and cotton may be brought by the students. No expenditure.

- (8) *Darning, repairing a hole*—Old garments may be brought by the students.

Darning Cotton and Needle	As. 4	0 4 0
For the above 8 items scissors (approximate cost As. 12), 2 cotton reels (approximate cost As. 4), sewing needle (approximate cost 6 p.) and a carpot needle (approximate cost 6 p.) will be needed.		1 0 0

## B.

To show "*kantha*" stitch, a baby's *kantha* may be made with old cotton and threads taken out of borders of old *saris*.

The other stitches may be shown on different items mentioned under A.

*If they are shown on sample—*

Cotton cloth	As. 7	0 7 0
Silk threads, 3 skeins	A. 1 per skein	0 3 0
<i>Fancy work on net—</i>		
Net	.. As. 4	0 4 0
Silk threads, 2 skeins	.. A. 1 per skein	0 2 0
<i>Zari work—</i>		
Velvet $\frac{1}{2}$ yd.	.. As. 8	0 8 0
Zari $\frac{1}{2}$ tola	.. „ 10	0 10 0
<i>Pillow-case corner—</i>		
Long cloth 1 yd.	.. As. 5 per yd.	0 5 0
A frame for drawn-thread work	.. „ 10	0 10 0
Silk threads, 2 skeins	.. A. 1 per skein	0 2 0
Crochet cotton, 1 ball	.. As. 3	0 3 0
Crochet needle, 1	.. „ 2	0 2 0
One very sharp-pointed small scissors	.. „ 10	0 10 0

For applique work pieces of cloths of different colours may be brought by the students.

Total Rs. 200 0 0

## MUSIC

### List of Appliances for teaching Music

#### Indian Music

			Rs
1. One Tanpura	..	..	48
2. One box Harmonium	..	..	80
3. One pair Tabla	..	..	12



				Rs.
4.	One Pakhoaj	..	..	20
5.	One Khol	..	..	10
6.	One Esraj	..	..	30
7.	One Sitar	..	..	30
8.	One Violin	..	..	30
9.	Books on music for library	..	..	90
10.	Furniture	..	..	50
Total Rs.				400

*Western Music*

## 11. Pianoforte.

## DOMESTIC SCIENCE INCLUDING DOMESTIC HYGIENE

*List of Appliances for teaching Domestic Science including Domestic Hygiene*

*Table*—5'-6" long 4 ft. wide for the Teacher for Demonstration purposes.  
*Black-Board.*

*Ovens*—2 girls to one washing sink.

*Cooking Utensils.*

*Measuring Cups and Measuring Spoons.*

*Spoons*—a set of 6, of different measurements.

*Individual Spoons for cooking purpose*—Ditto for each of three girls.

*Knives, Sieves.*

*Rolling Board and Pins.*

*Jharans for dusting and wiping utensils.*

*Plates, Cups, Saucers, Tumblers for dining.*

*Lockers*—2 girls to one for keeping utensils, etc.

*Stools*—for students to sit on rather than desks and benches.

*Aprons for students to wear during cooking class.*

*Laundry*—Washing sinks, mangle, table for ironing, irons (2).

*String and pegs*—for clothes and blankots for ironing Board.

*Cupboard*—for keeping goods for the class in general.

Large washing sinks for general washing.

A set of charts and pictures for demonstrational purpose (composition of vegetables, meats, eggs, fish, fruits, etc.).

*Bed*—to make bed for the home and for a patient, mattresses, sheets.

*A crib or basket*—for a baby.

*Mattress, Pillow, Washing Tub Towel.*

A model house—plan showing the ideal arrangements of rooms, latrines, out-house, etc. (This may be made in the School.)

A simple apparatus to demonstrate the principles of ventilation (already included in the list of appliances for Elem. Sc. Knowledge).

A set of charts, illustrating germs, bacilli and other carriers of diseases.

A quantity of soda, blue starch, *Ritha* for laundry work.

Samples of cotton, wool, silk.

Charts showing the structure of the human body and the functions of the different organs thereof (already included in the list of appliances for Elem. Sc. Knowledge).

Thermometer and squared paper to make Temperature chart for Doctor's use and for keeping other records.

Measure-glass, Feeding cups, Syringe, Ice-bag.

A set of First-aid appliances : Tinct. Iodine, Benzine, bandages, cotton, etc.

Powdered rice and coloured flour for *alpana*.

*Dhup, Dhuna, Sulphur, Bleaching Powder, Phenyle, etc., for cleaning.*

*Total cost for equipping the above class would be Rs. 200 approximately.*

## DRAWING AND PAINTING INCLUDING AN APPRECIATION OF FINE ARTS

*List of Appliances for teaching Drawing and Painting including an Appreciation of Fine Arts*

I. For the Theoretical Course for developing appreciation and understanding of the Fine Arts the following illustrative materials or such of them as may be available for study are prescribed :—

## 1. PAINTING.

- (a) Colour Post Cards published by the National Gallery, London—  
 No. 1007 : Bellini : Portrait of Doge Loredano.  
 No. 1003 : Hobbema : The Avenue.  
 No. 1072 : El Greco : The Agony in the Garden.  
 No. 1082 : Sassoferrato : Madonna in Prayer.  
 No. 1004 : Perugino : The Virgin Adoring.  
 No. 1024 : Rubens : "Chapeau de Paille."  
 No. 1925 : Turner : The Flying Temeraire.  
 No. 1089 : Hogarth : The Shrimp Girl.  
 No. 1075 : Botticelli : Madonna and Child.  
 No. 1008 : Vermeer : A Lady at the Virginals.  
 No. 1098 : Leonardo Vinci : The Virgin of the Rocks.  
 No. 1081 : Rembrandt : Portrait of F. V. Wasserhoven.  
 No. 1054 : Corot : The Bent Tree.

Price two pence each.

- (b) Colour Post Cards published by the Medici Society, London.  
 No. 14 : Fra Angelico : The Annunciation.  
 No. 108 : Leonardo Vinci : Mona Lisa.  
 No. 2 : Leonardo Vinci : Head of Christ.  
 No. 129 : Raphael : Madonna della Sedia.  
 No. 105 : Filippino Lippi : An Angel Adoring.  
 No. 101 : Holbein : Georg Gisze.  
 No. 155 : Vermeer : Girl at the Casement.  
 No. 47. Rossetti : The Annunciation.

Price two pence each.

- (c) Published by F. Hofstaengl, Munich :  
 No. 143 : Pietà School of Avegnon.  
 No. 13 : Van Gogh : The Sunflower.  
 (d) British Museum series of Coloured Post Cards.  
 (1) Set B4 : Japanese Colour Prints.  
 (2) Set B46 : Mughal Painters of the early 17th century.  
 (3) Set B33 : Indian Painting, Buddhist and Rajput Schools.

Price one shilling per set

## 2. SCULPTURE.

- (1) Post Card No. XCVIII : Classical Greek Sculpture, published by the British Museum, London. Price one shilling.  
 (2) A Picture Book of Gothic Sculpture, published by Victoria Albert Museum, London. Price six pence.  
 (3) A special set of Post Cards of Indian, Indonesian and Chinese Sculpture, to be issued by Mr. O. C. Gangoly. Price 8 as.

*In studying these examples of masterpieces, emphasis should be laid on the quality of their colour, composition and form and not on their subject-matter or their authors or their lives.*

II. For the Practical Course the following Drawing Books are recommended

- (a) Bengali Students' Drawing Books by E. B. Havell, Books I, II, III (Macmillan & Co.) (optional).  
 (b) Rupavali, 2nd part, by Nandalal Bose (Chuckerbutty, Chatterjee and Co.).  
 (c) Indian Artistic Anatomy by Dr. A. N. Tagore, C.I.E. (published by the Indian Society of Oriental Art, Calcutta), (optional)

## APPENDIX D

### SYLLABUSES AND COURSES OF STUDIES ADOPTED BY THE SYNDICATE ON THE RECOMMENDATION OF THE RELEVANT BOARDS OF STUDIES

#### INTERMEDIATE EXAMINATION IN ARTS

##### ARABIC\*

The course in Arabic shall include easy pieces in Poetry and Prose, the latter in the form of tales, anecdotes, biographical and historical narratives, accounts of travels and didactic stories selected from any or all of the following words in classical and modern Arabic :—

##### *Prose*

##### *Literature :*

Qur'an.

Mishkat-al-Masabih (passages of a non-contentious nature to be chosen).

al-Munabbihat, by Ibn al-Hajar.

Kalila wa Dimna.

Ikhwan al-Sifa.

Nihayat al-Arab.

Kitab al-Mahasin wa al-Masawi, by al-Baihaqi.

Majani al-Adab (Pts. III-IV).

##### *History, Biography :*

al-Kamil, by Ibn al-Athir.

Wafayat al-A'yan, by Ibn Khallikan.

##### *Travels :*

Tuhfat an Nuzzar, by Ibn Battutah.

##### *Modern Literature :*

Bahr al-Adab (Pts. III-IV; Pubd. : Alexandria).

##### *Poetry*

Diwan of Hassan b. Thabit.

Diwan of Abu al-Atahiyah.

Diwan of Ibn Zaydun.

Diwan of ar-Rasafi.

Qasidat al-Burdah, by al-Busiri.

Qasa'id of al-Farazdaq.

Majani al-Adab (Poetical passages).

Mahr al-Adab.

##### PERSIAN†

The course in Persian shall include easy pieces in Poetry and Prose the latter in form of tales, anecdotes, biographical and historical narratives, accounts of travels and didactic stories, selected from any or all of the following works in Classical or Modern Persian :—

##### *Prose*

##### *Literature :*

Kalila wa Dimna, by Nasrullah.

##### *Ethics :*

Akhlaq-i-Muhsini, by M. Hussain al-Wai'z.

\* Vide page 179.

† Vide page 181.

**History, Historical Geography :**

Tarikh-i Sasanian.

Fars-nama by Ibn al-Balkhi.

Haft Iqlin, by Amin Ahmad Razi.

Riyaz- as Salatin, by Ghulam Husain Salim.

**Stories :**

Nigaristan, by Qazi Ahmad Ghaffari.

**Letters :**

Ruqa 'at-i-' Alamgir.

**Modern Persian :**

Tarikh-i Adabiyyat-i Iran, by Dr. Riza Zada Shafaq.

*Poetry***Mathnawi :**

Sikandar-nama, of Nizami.

Majnun-Laylah, of Khusrau.

Yusuf wa Zulaikha, of Jami.

'Ibrat-Afza, of 'Ubaidi.

**Qasideh :**

Qasa'id-i Sa'di.

Qasa'id-i Salman Sawaji.

**Ghazal :**

Ghazaliyyati-i Khusrau.

Ghazaliyyati-i Jami.

Ghazaliyyati-i 'Ali Hazin.

**Ruba'i :**

Ruba'iyat-i 'Umar-i-Khayyam.

Ruba'iyat-i Sahabi.

**Modern Persian :**

Sukhanwaran-i Iran dar' Asr-i.

Hazir (Poetical Selections only), by Md. Ishaque.

**BACHELOR OF ARTS****ARABIC\***

(1) The course in Arabic shall consist of Selections in Prose and Poetry containing passages in various styles, simple as well as ornate, chosen from the standard works of representative authors of different periods down to the present time. It shall be compiled from any or all of the following works in Classical and Modern Arabic :—

*Prose***Literature :**

Qur'an with Tafsir Madarik.

as-Sahih, of Muslim.

Kitab al-Bayan wa at-Tabyin, of al-Jabiz.

al-Kamil, of al-Mubarrad.

Kitab al-Aghani (Rannat al-Mathalita wa al-Mathani, Vol. I).

Maqamat, of Badi 'az-Zaman.

al-Mustatraf.

**History :**

al-Buldan of al-Baladhuri.

Muruj adh-Dhahao of al-Mus'addi.

Kitab al-Adab as-Saltaniyyah of Ibn at-Tiqtatqa.

al-Khitat wa al-Athar of al-Maqrizi.

*Vide pages 206-07.*

*Historical Geography :*

Rihlat, of Ibn Jubair.

*Biography :*

Kitab at-Tabaqat al-Kabir of Ibn Sa'd.

*Sufism :*

Ihya 'U- 'Ulum ad-Din, of al-Ghazali.

*Modern Literature :*

Essays of Rifa'i.

*Poetry*

Diwan of 'Abid b. al-Abras.

" Hassan b. Thabit.

" Mutanabbi.

" al-Hamasah, of Abu Tammam.

" 'Umar b. Abi Rabi'ah.

" Ibn al-Mu'tazz.

" Ibn ar'Rumi.

" Ibn Hani.

" Shawqi.

The Board of Studies concerned may make such changes in the list of books as may seem desirable to them.

The course shall include outlines of history of Arabic Literature, Elementary Rhetoric and Arabic Grammar according to the modern method,

(2) The Honours course shall include, in addition to the above, the whole or selected portions of the following works:—

*Prose**Literature :*

Qur'an with Tafsir of al-Baidawi.

as-Sahih of al-Bukhari.

al-Iqd al-Farid, of Ibn Abdi Rabbihi.

'Uyūm al-Akhbar, of Ibn Qutaibah (Khutab).

Kitab al-Aghani (Beirut Selections, Vol. II).

Kitab al-Amali of Abu 'Ali al-Qali.

al-Magamat of al-Hariri.

*History :*

as-Sirah, of Ibn Hisham.

'Tarikh, of at-Tabari.

al-Muqaddimah of Ibn Khaldun.

*Biography :*

Irshad al-Arib (Gibb Mem. Ser.).

*Philosophy :*

Hadiyyah Sa'idiyyah.

Hujjat Allah al-Belighah.

*Modern Prose :*

Absanna Ma Kutibat (al-Hilal Press).

*Poetry*

al-Mu'allaqat al-'Asha.

al-Mufaddaliyyat.

Diwan of Imru'al-Qays.

" al-Khansa.

" al-Akhtal.

" Abu al-'Ala al-Ma'arri.

" Hafiz Ibrahim.

The Honours course shall also include the elements of Arabic prosody and rhetoric and the outlines of the history of Islam to the reign of al-Ma'mun and a general knowledge of the history of Arabic literature.

## PERSIAN\*

(1) The course in Persian shall consist of selections in Prose and Poetry containing passages in various styles, simple as well as ornate, chosen from the standard works of representative authors of different periods down to the present time. It shall be compiled from any or all of the following works in Classical or Modern Persian :—

*Prose**Literary and Ethical :*

Kimiya-i Sa'adat, by al-Ghazali.

*History :*

Tarikh-i Tabari, tr. of Abu 'Ali al-Bal-ami.

Siyasat-nama, of Nizam al-Mulk.

Tarikh-i Firozshahi, of al-Barani.

*Historical Geography :*

Nuzhat al-Qulub, of Hamdullah al-Mustawfi Al-Qazwini.

*Biography :*

Muntakhab at-Tawarikh, by al-Bada'uni.

Mkizannah-i 'Amirah, by *Azad*.

Khulasat at-Tawarikh, by Sujat Rai.

*Modern Persian :*

Intisharat-i Iranshahr (Vols. I-II) (Published in Berlin).

*Drama and Poetry**Mathnawi :*

Shah-nama, of Firdausi.

Mathnawi, of Jalal au-Din Rumi.

Ramayan of *Masih* Panipati.

*Qasidah :*

Qasa'id-i *Minuchihri*.

„ *Zahir-i Faryabi*.

„ *Kamal- Isma'il*.

„ *Qa'ani*.

*Ghazal :*

Ghazaliyyat-i Rudaki.

Sa'di.

Hafiz.

Sa'ib.

Brahman.

Tahirah (Qurrat at'-Ayn.).

*Miscellaneous :*

Payam-i Mashriq, of *Iqbal*.

Zabur-i 'Ajam.

*Modern Persian :*

Shu'ara-i 'Asr-i Pahlavi, by D. J. Irani.

*Drama :*

Rastakhiz, of Mirzadeh 'Ishqi.

The course shall include outlines of the history of Persian literature, Elementary rhetoric and prosody and Persian Grammar according to the modern method.

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\* *Vide* pages 208-09.

(2) The Honours Course shall include, in addition to the above the whole or selected portions of the following works :—

*Prose*

*Literature :*

Tafsir-i-Qur'an, Edited by H. M. Shirani.  
Chahar Maqalah, of Nizami-i Arudi.

*Sufism :*

Kashf al-Mahjub, of al-Hujwiri.

*Ethical Philosophy :*

Ausaf al-Ashraf, of Nasir ad-Din at-Tusi.

*History :*

Jami'at Tawarikh of Rashid ad-Din.  
Akbarname, of Abu Al-Fadl Allami.

*Biography :*

Sarw-i Azad, by Ghulam 'Ali Azad.

*Modern Persian :*

Bist Maqalah-i Qazwini (Vols. I and II).

*Miscellaneous :*

Gathas, Translation of Poure Davood.

*Poetry*

*Qasidah :*

Qasa' id-i Mu'zzi.  
„ Khaqani.  
„ Anwari.  
„ 'Urfi.

*Ghazal :*

Ghazaliyyat-i Jalal ad-Din Rumi.  
„ Naziri.  
„ 'Iraqi.  
„ Ghalib.

*Ruba'i :*

Raba'iyat-i Baba Tahir.

The Honours Course shall also include the Elements of Persian Prosody and Rhetoric ; the outlines of the history of Islam in Persia and India ; and a general knowledge of the history of Persian Literature.

## BACHELOR OF TEACHING

### CONTENTS AND METHODS OF TEACHING SCHOOL SUBJECTS

#### (I) CONTENTS

Candidates will be expected to show an adequate knowledge of the syllabuses and the subject matter taught in school up to the Matriculation standard in the subjects selected by the candidates under Section 7(4).

#### (II) METHODS OF TEACHING

The syllabuses for the methods of teaching school subjects will be on the following lines :—

*English*

The place of English in the education of Indian Children. Aims of teaching English in India. English and the mother tongue. The problem of Bilingualism.

Psychology of teaching English. Common difficulties in teaching the language. Various methods of teaching; Basic English, Direct Method. West's New Method, Palmer's Method and other methods; their advantages and disadvantages.

Oral method of teaching. Spoken English. Local speech habits and their influence. Peculiar difficulties of Indian children.

Necessity of training in Phonetics for language teachers. Organs of Speech. Analysis and Classification of Sounds. The International Phonetic Association Alphabet.

Reading—Silent and Loud Reading. Qualities of good Reading. Reading in the Class. Intensive and Extensive Reading. Rapid Reading Books and their use. The use of the Class Reader.

Teaching of Poetry. Aims. Methods.

Spelling difficulties. The Use and Abuse of Dictation. Punctuation.

Grammar, its place in the curriculum. Old and new methods of teaching grammar.

Composition—Oral and Written. The use of Models and Pictures in Composition. Essay writing.

The place of Translation in teaching languages.

Handwriting. Marks of good Handwriting. Different Styles. The advantages of Script Writing.

### *A Modern Indian Language (Bengali)*

Importance of the mother-tongue in education. Aims of teaching the mother-tongue.

Bengali: Spoken and written. The influence of local dialects on speech habits. The importance of the study of phonetics for language teachers.

Reading. Silent and Loud Reading.

Teaching of Poetry. Bengali Metre and Prosody.

Teaching of Prose. Types of Prose Reading. Stories and Essays.

Bengali Grammar: Its characteristics. The old and the new methods of teaching grammar.

Errors in spelling and their causes. Study of words.

Bengali punctuation.

Study of Bengali rhetoric.

Translation: its place in the curriculum. Method of teaching translation from English to Bengali.

Sentences and paragraphs: their integrity and inter-connexion. Method of teaching by different examples.

Composition and Essay-writing. Combination of oral and written work.

Stages in the learning of Bengali.

The above syllabus will be used with necessary changes for Assamese, Hindi and Urdu.

### *Mathematics*

Aims of teaching Mathematics in schools. Different methods in teaching Mathematics—Synthetic and Analytic, Inductive and Deductive.

Arithmetic: Concept of Number. The First Four Rules. Fraction and Proportion, Decimal Fraction. Solution of Problems. The connection between Algebra and Arithmetic. Purposes of teaching Arithmetic. Abstract and Concrete Arithmetic. Methods of teaching Arithmetic.

Algebra: Scope and Definition. Directed numbers and Fundamental Operations. Symbolism. Fundamental Laws. Formulae. Factorisation. Equation. Irrational Numbers, Algebraical Problems. Importance of Graph.

Geometry. Elementary Concepts. Simple Practical Exercise in early stages. Synthetic and Analytic Methods of Demonstration. Methods of attacking Geometrical Problems and Constructions.



Algebra in Geometry. Origin and Development of Geometry. Euclidean and Non-Euclidean Geometry.

Numerical Trigonometry. Measurement of Angles.

Trigonometrical Ratios. Heights and Distances. Elements of Surveying.

Teaching of Mensuration and Mechanics.

Practical work and use of appliances in connection with the teaching of Mathematics.

### *History*

The place of History in Education. The aims of History instruction. Early conception of History; Scientific conception; Modern conceptions.

The Scope of History, Race, Environment; Language; Arts; Religion; Society; Public Institutions, Attainments in Science.

Steps in History teaching.

The problem of grading History; The practice in Bengal as compared to the practice in other countries. Syllabus of History in other countries; History in our School curriculum; Our special difficulties.

The biographical approach to History; Principles of selection. The study of social groups.

Concrete illustration. How to make History real. Historical Museums. Excursions, Charts, Models, Portraits, Plans; the idea of Chronology—; Time Scale, Maps, Diagrams and other special devices. Dramatised History; History teaching by dialogues—Visualisation.

The Historical method; Sources; Documents as atmosphere, Documents as exercise.

Text-books on History; how to use them.

History and allied studies; Collateral Reading; How to use the library.

Correlation of History with other subjects. Geographical background of History.

The History examination; general conception; School Examinations in different countries; what history examination should aim at.

Specimen Lessons. Selected topics on Ancient, Mediaeval and Modern periods of Indian History and of English History.

### *Primary and Infant School Subjects*

Primary curriculum. Its basic objectives.

3 R's, their place in the Primary curriculum.

Basic principles of teaching young children. Importance of habit formations.

Reading. Different methods of teaching Primary reading, Alphabet, Phonetic, Word and Sentence Methods. Stories and Story-telling.

Silent reading.

Oral Composition. Formation of language habits. Written composition. Nursery Rhymes and their value. The necessity of teaching poetry.

Rhythm and rhythmic exercises.

Handwriting. Primary exercises and different systems.

Arithmetic; Concept of Numbers and manipulation. Teaching of Four Simple Rules. Ideas of Fraction and Quantitative Measures. Introduction of the Decimal system. Problems involving four simple rules. *Subhankari* and Mental Arithmetic.

History and Geography in the Primary School.

Nature Study. Drawing and Handicrafts; Their Importance and Use.

Use of Activities, Games and Appliances in teaching young children. Kindergarten. Montessori, Decroly, Project and other methods.

Use of Tests in Primary schools.

*Geography**(Theoretical)*

## FIRST HALF

*The Physical Basis of Geography* .. .. 80

Shape and size of the earth. Latitude and Longitude. The movements of the earth and the resulting diurnal and seasonal changes. The crust of the earth—igneous, sedimentary and metamorphic rocks. Processes of weathering types of land forms—Plains, Plateaus, Mountains, Valleys. Lakes and their characteristics. Rivers, Glaciers and Winds, as agents of transportation, corrosion and deposition. Types of coasts and coastal erosion. Volcanoes and earthquakes.

Elements of Climate—temperature, pressure and wind, rainfall. Factors of climato. Types of climate.

Movements of Oceanic waters—tides and currents.

*Method of Teaching Geography* .. .. 20 marks

The Geography room and its equipment. Methods of teaching physical basis of geography. Illustrative material in physical geography. Map work Modelling.

## SECOND HALF

*Human, Regional and Economic Geography* .. .. 30 marks

Natural regions of the world on the basis of relief, climate and vegetation. Modes of life and means of sustenance in typical areas of the world. The outlines of the geography of the continents: Surface relief, climatic conditions, river systems, vegetation and animal life, agriculture, industry and commerce, ports and inland towns, political divisions.

Principles of Commercial Geography—Agriculture and Mining; Industries; Transport facilities; Ports and Trade centres.

Geography of India and any two of the following countries to be treated in some detail :—

		{ Great Britain
		{ France
Europe	..	{ Germany
		{ Italy
Eurasia	..	{ U. S. S. R.
Asia	..	{ China
		{ Japan
North America	..	{ U. S. A.
		{ Canada
South America	..	{ Brazil
		{ Argentina

(The two countries are to be prescribed from time to time by the Board of Studies in Teaching.)

*Method of Teaching Geography* .. .. 20 marks

Methods of teaching human, regional and economic geography. Illustrative material in teaching human, regional and economic geography. Correlation with other subjects. Value of local study in geography teaching. Use of statistics in school geography.

*(Practical)*

Simple meteorological observations; maximum and minimum thermometer; dry and wet bulb thermometer; barometer; rain gauge; Plotting of meteorological data.

Map projection. Drawing of maps on cylindrical, conical and zenithal projections by graphical method.

Conventional signs used in survey maps; interpretation of topographical maps of typical areas of India.

Drawing and interpretation of climatological and economic maps.

Identification of rocks (Granite, Basalt, Sand-stone, Limestone) and cereals and fibres.

Chain surveying and Plotting of data to scale.

### *Physical Sciences*

#### *(I. Physics, II. Chemistry and III. Astronomy)*

*Methods of teaching Science* (for Physical Sciences as well as Biological Sciences and Geology).

(a) Aims of Science Teaching.

(b) Claims of Elementary Science to a place in the curriculum of secondary schools—purpose and construction of the syllabus—interpretation of the syllabus and the teaching of individual subjects—general nature of the teaching of Science.

(c) Detailed study of the various methods—Practical and Theoretical—Method of Investigation—Heuristic Method; History of Discovery—Herbartian method applied to Science Teaching—Deductive and Inductive methods—the ‘Sequence’ and ‘Forms’ of instruction—the Logical and Psychological Sequences—Analysis and Synthesis—Generalisation—Preparation of notes of lessons.

(d) Habit and Skill in Science Teaching—Instruction aiming at Skill—Intellectual control of data—Note-books—Diagrams and lesson notes—Text-books—Reference for further reading.

### *Contents*

#### *(i) PHYSICS*

##### *(Theoretical)*

The three states of matter; Solids and Fluids; Liquids and Gases.

Physical properties of Air; Physical properties of Water; Buoyancy; Archimedes' Principle; Specific Gravity; Determination of Specific Gravity; Pressure of Air; Barometer.

Effect of heat on Water; Effect of heat on Air; Ventilation; Wind.

Effect of heat on solid bodies; Pendulum Clock; Thermometer—Maximum and Minimum Thermometer, Clinical Thermometer.

Transference of heat; Conduction; Convection; Radiation; Simple ideas regarding energy; Potential Energy; Kinetic Energy; Transformation of Energy.

Rectilinear propagation of lights; Shadows; Eclipse of the sun and the moon.

Laws of reflection; laws of refraction; prism; lens; colours; spectrum colours; Newton's disc; colours of bodies; rainbow.

Lodestone; artificial magnets; soft iron and steel; polarity; magnetic needle; terrestrial magnetism; ship's compass; lines of force due to a magnet.

Simple electric cell. effects of current—(a) heating, (b) lighting, (c) chemical, (d) magnetic.

Electromagnet, electric cell, telegraph.

##### *(Practical)*

Weighing by oscillation methods.

Verification of Archimedes' principle; determination of specific gravity of solids and liquids by different methods.

Barometer reading with correction pendulum.

Fixed points of thermometer; determination of co-efficient of linear expansion of a solid.

Verification of laws of reflection; verification of laws of refraction; production of pure spectrum; magic lantern.

Preparation of artificial magnets; determination of poles; drawing of lines of force.

Preparation of simple voltaic cell; electric bell, telegraph, electrolysis; electromagnet.

## (ii) CHEMISTRY

### (Theoretical)

1. Homogeneous and heterogeneous systems; mechanical mixture; emulsions; suspension; solutions; chemical compounds.

2. Characteristics of chemical change; combustion; fire and the flame of a fire.

3. Common laboratory processes; filtration; distillation; sublimation; crystallisation.

4. Pneumatics: pneumatic trough; beehive shelf; gas jars and covers; collection of dry gases over mercury and mercury trough.

5. Air; its composition; part played by the constituents in maintaining life on earth; artificial fixation of atmospheric nitrogen.

6. Limestone; quick-lime and slaked lime; hard water and soft water.

7. Preparation and properties of the common gases; Oxygen, Nitrogen, Hydrogen and Carbon Dioxide.

### (Practical)

1. Emulsion of cocoanut oil and water: Curdling of milk with acids.

2. Bunsen flame; candle flame; action of heat on (1) sodium hypophosphite, (2) sodium thiosulphate, (3) ammonium dichromate.

3. Separation of (1) alum and sand, (2) camphor and sand. Preparation of distilled water (Liebig's condenser); Purification of copper sulphate; Suspended crystallisation of lead acetate and sodium thiosulphate.

4. Collection of dry ammonia over mercury and of hydrogen, oxygen over water; of carbon dioxide by displacement of air.

5. Ventilation of  $\text{CO}_2$  from a chimney surrounding a candle flame; combustion of phosphorus under a bell-jar over water; rusting of iron.

6. Action of water on quick-lime and of carbon dioxide on lime-water.

Preparation and collection of oxygen and separation of  $\text{MnO}_2$  from potassium chloride.

## (iii) ASTRONOMY

Apparent motion of the heavens—horizon—celestial sphere—Pole star—Polar axis—circumpolar stars. Apparent motion of the Sun, the Moon and the planets.

Model of the celestial globe and its uses—circles of the celestial sphere—meridian, equator, ecliptic, the signs of the Zodiac, the first point of Aries.

Path of the sun across the celestial sphere—position of sunrise on the horizon—how it varies throughout the year.

Altitude of the pole star is the latitude of the observer.

Well-known constellations—peculiarities with regard to some of them.

Planetary system—the sun and the other members of the solar system—satellites of planets—superior and inferior planets and their phases—rotation between the mean distance and the periodic time of the planets—determination of their apparent positions in the sky.

The Sun—dimensions—physical state—photosphere—chromosphere—prominences—sunspots—twilight—solar year—Bengali year and the month—Calendar—Julian and Gregorian corrections.

Lengths of day and night varying during the year and at different places—seasons.

The Moon—dimensions—distance—apparent motion—phases—27 divisions of the ecliptic—lunar year and month—importance in connection with the date of festivals—*Malamasha*.

Eclipses—Solar and lunar, how they are caused—different kinds of eclipses—why eclipses do not occur at every full moon and new moon.

Comets and meteors.

Time—unit for the measurement of time—different kinds of time—Sidereal, solar, mean solar and local time—Equation of time—Sun-dial.

Nebular hypothesis—Nebulae, Milky way, star culsters—different kinds of stars—spectroscopic study of stars.

## BIOLOGICAL SCIENCES (I. BOTANY, II. ZOOLOGY AND III. PHYSIOLOGY) AND GEOLOGY

### (i) BOTANY

#### (Theoretical)

General—Life and living beings, plants and animals, Biology and Botany; Outline classification of plants; a general acquaintance with an alga, a fungus, a moss, fern, gymnosperm, a monocotyledon and a dicotyledon; different branches of Botany.

Morphology—Study of the different members of a flowering plant, such as, roots, stem, buds, branching, leaf, arrangement of leaves on stem and branches, inflorescence, flower, pollination and fertilization; fruit and seed, dispersal of seed.

Histology—The cell and its structure; living and non-living contents of a cell; simple consideration of the structure of a typical stem, leaf and root.

Physiology—Physiology of nutrition including food materials, their sources, their absorption, transport through root and stem, transpiration, photo-synthesis, storage and digestion of food material; growth, respiration, irritability and reproduction.

Consideration of the principal and subsidiary functions of stem, leaf and root, flower, fruit and seed in a very simple way. Adaptation to environment; self-protection.

#### (Practical)

Examination and drawing of parts of a complete plant, structure of a few typical seeds; examination of normal, adventitious and modified root normal and modified stems, simple and compound leaves, their arrangement on stems and branches, their venation and a few important modifications.

Observation and drawing of a few commonly occurring types of inflorescence, typical bisexual and unisexual flowers and their parts, and a few typical fruits of Bengal.

Examination of a cell, movements of protoplasm, microchemical tests of starch, protein, fats and oils; structure of stem, leaf and not in transverse sections.

Demonstration of the following simple physiological experiments: Osmosis in egg, potato osmoscope, passage of water in stem, presence of starch in green leaves, evolution of oxygen during photosynthesis, solar and absorption spectrum of chlorophyll solution, transpiration, respiration, effects of gravity, sunlight and water on stem and root.

## (ii) ZOOLOGY

*(Theoretical)*

Characteristic of the living matter. Difference between living and non-living. Difference between animal and plant.

The general morphology of the cell. Cells: Animal and Vegetable. Characteristic of Protoplasm. Cell division. Tissues; Organs.

Division of Zoology into different branches.

Classification of the animal kingdom. Chief characteristics of each Phylum with examples. Difference between Vertebrata and Invertebrata.

Bionomics, structure and life-history of an Indian earthworm. Pheretima.

The general characters and broad classification of insects.

The structure and life-history of social insects, e.g., ants and honey-bee.

The structure and life-history of mosquitoes. Devices to combat malarial disease.

The general characters of Lepidoptera (moths and butterflies). Difference between a moth and a butterfly. The structure and life-history of silk-moth.

The structure and life-history of a spider.

The general characters of Chordata.

Elementary study of Rohu.

Different kinds of Fishes. Accessory air-breathing organs in fishes.

The general character of Amphibia. Life-history of toad or frog.

Interdependence of plants and animals.

Adaptation to environments.

*(Practical)*

Microscopical study of unicellular animals.

Demonstration of the general characters of animals belonging to different phyla.

Dissection of the respiratory and alimentary systems of the Earthworm.

Microscopical examination of the transverse section of the Earthworm.

Dissection of the circulatory, respiratory and alimentary systems of Rohu.

Demonstration of the general visceral organs of Toad.

## (iii) PHYSIOLOGY

*(Theoretical)*

*Introduction: Definition and aim of Physiology—*

Characteristics of life:

Birth.

Growth—assimilation—abolism.

Vital reactions—adaptation to environment—out of energy—abolism—oxidation.

Reproduction.

Death.

*Physical Basis of Life—*

The animal cell—comparison with vegetable cell.

Growth of the multi-cellular animal from a single cell.

Elementary tissues—organs—systems.

Simple anatomical consideration of the different systems, specially—the circulatory, the respiratory, the digestive, and the osseous system (the human skeleton).

*Chemical Basis of Life—*

Chemistry of Protoplasm—the elementary constituents—the proximate constituents, *e.g.*, Organic proximate constituents—the structure-producing proteins and lipides—the energy-producing carbohydrates and lipides.

Inorganic proximate constituent—water and inorganic salts.

*Food—*

Uses of Food. Making up of standard Dietary, *i.e.*, Principle of determination of total daily requirement of food as a whole and of the individual items, *e.g.*, proteins, lipides, carbohydrates, water and various inorganic salts.

Importance of vitamins.

*Physiology of the Digestive System—*

General structural consideration of the digestive system. Glands—their structure and functions; the nature and actions of Ferments.

Digestion in the mouth, the stomach and in the small intestines; Functions of Liver and Bile.

Absorption and fate of various foodstuffs.

Movement of food. Functions of large intestines.

*Physiology of the Circulatory System—*

General consideration of blood—the formed elements—plasma and their functions.

Structure and function of Heart—the Cardiac Cycle.

Circulation through blood vessels—arteries, capillaries and veins.

The course of circulation.

Importance of blood pressure.

Lymph—its formation and functions.

*Physiology of Respiration—*

General structural consideration of the organs of respiration.

Mechanics of respiration.

Mechanism of gaseous interchange in lungs and tissues.

State of the gases in blood.

*The Excretory System—*

Kidneys—their structure and functions.

Skin—its structure and diverse functions.

*The Nervous System—*

Neurone—the unit of the nervous system.

Sensory and motor nerves.

Reflex action.

Reflex functions of the spinal cord, medulla, midbrain and cerebellum.

Functions of cerebrum.

Autonomic system as different from the cerebro-spinal nervous system.

*The Sensory System—*

General consideration of the structure of Nose, Tongue, Eye and Ear as sensory organs.

*(Practical and Demonstration)*

Study of the Compound Microscope.

Microscopical examination of Yeast and Paramoecium.

Demonstration of pithing of frog. Dissection of frog (Demonstration).

Dissection of a mammal—a cat or rabbit (Demonstration).

Microscopical examination of epithelial tissues—squamous and ciliated.

Demonstration under the microscope of Compound epithelium.

Microscopical examination of connective tissues—Areolar and Cartilage.

Microscopical examination of voluntary muscle fibres and nerve fibres.

Microscopical examination of blood films—human and amphibian—staining of blood film.

- Demonstration of circulation of blood through capillaries.
- Demonstration of clotting of blood.
- Chemical tests of Starch, Dextrin, Canesugar and Reducing sugars.
- Hydrolysis of Starch and Canesugar.
- Chemical tests for Proteins and some simple tests for Fat.
- Myographic demonstration of effect of stimulation on nerve muscle preparation of frog.
- Myographic demonstration of Normal heart beat of frog.

## GEOLOGY

*(Theoretical)*

The Earth—condensation from a hot gaseous state ; latest theory of its origin : why Laplace's hypothesis was discarded.

The crust—mode of origin and character of igneous, sedimentary and metamorphic rocks.

The nucleus—how we can arrive at an idea about the earth's interior temperature and other physical condition ; chemical constitution.

Earthquakes—causes, effects, distribution. Earthquake shock—propagation ; Seismograph.

Earth movements—folding ; faulting ; landslide and its causes.

Volcanoes—distribution ; characteristics of volcanic eruption.

Soil—agencies of formation ; varieties ; classification according to physical properties ; chemical composition bearing on plant life.

Formation of coal—in *situ* and drift theories.

Formation of mineral oil.

*(Practical)*

1. Recognition of the hand-specimens of the rock-forming minerals and the chief types—igneous, sedimentary and metamorphic rocks.

2. An elementary study of the more important rock-forming minerals under the microscope.

3. Recognition of the more important classes and orders of fossils found in the sedimentary rocks, *e.g.*, Foraminifera, Radiolaria, Corals, Graptolites, Echinoderms, Brachipods, Pelecypods, Gastropods, Trilobites.

SYLLABUS FOR "VISUALLY HANDICAPPED CHILDREN" (*VIDE*  
CHAPTER XL, SECTION 16, SUB-SECTION (F)(ii) UNDER  
THE HEAD "ADDITIONAL PAPER," Page 439)

(i) History and Survey of the Visually Handicapped.

The Blind in Ancient and Mediaeval Times.

Life and Education of a few Blind Persons (Didymus of Alexandria, Nicholas Saunderson, John Metcalf, Jacob of Netra, Maria Theresia von Paradis, Weissenburg, etc.).

Early Beginning of the Education of the Blind ; Establishment and Growth of the First Blind School.

Spread of Blind Education in Europe and the U. S. A.

Tactual Education before the Introduction of Braille ; the Point Systems and Later Phases of Embossed Literature.

Introduction and Development of Blind Education in India ; Indian Adaptations of Braille with Special Reference to Bengali Braille.

(ii) Psychology of the Visually Handicapped and Special Problems of their Education.

Emotional and Personality Problems of the Blind.

Sense-Perception and the Theory of Compensation.

Memory : Effects of Blindness on Memory.

Facial Vision : Factors involved in Facial Vision.



Intelligence : Adaptations of Intelligence Tests for use with the Blind.  
Verbalism *vs* Reality.

Phantasy Life of the Blind.

Public Attitude towards the Blind and its effects.

(iii) Practical Aspects of the Education of the Visually Handicapped.  
Aims and Functions of Blind Schools.

Practice Lessons in Standard English Braille (Grade II) and Bengali Braille. (The non-Bengali candidates are not required to study Bengali Braille.)

Education of the Partially-Sighted.

Day-School *vs* Residential Institution for the Blind.

Traits demanding special attention of Teachers.

# APPENDIX E

## DUTIES OF THE CONTROLLER OF EXAMINATIONS

### A. WORK PRECEDING THE EXAMINATIONS

#### *I. Work in connection with dates of Examinations.*

- (i) Fixing of dates.
- (ii) Printing of date-sheets.
- (iii) Issuing and publication of date-sheets.

#### *II. Work in connection with the ascertainment of probable candidates under each subject.*

- (i) Preparation of circular letters to Heads of Institutions, asking for the requisite figures.
- (ii) Printing of circular letters.
- (iii) Issuing of circular letters.
- (iv) Collection of figures from replies received.

#### *III. Work in connection with question-papers.*

- (i) Appointment of Paper-setters.
- (ii) Printing of forms of appointment letters, rules, forms of question papers (original and duplicate), and double (inner and outer) envelopes.
- (iii) Appointment of question-papers.
- (iv) Writing out of appointment letters.
- (v) Issuing of appointment letters with enclosures.
- (vi) Arrangements for printing question-papers.
- (vii) Arrangements for packing and despatching question-papers.

#### *IV. Work in connection with the appointment of Examiners.*

1.
  - (i) Preparation of circular letters with forms, inviting recommendations from Fellows and Heads of Institutions.
  - (ii) Printing circular letters with forms.
  - (iii) Issuing of circular letters with forms.
2.
  - (i) Compilation of lists of Examiners recommended, and candidates for examinership.
  - (ii) Printing of lists of Examiners recommended, and candidates for examinership.
  - (iii) Circulation of lists to the members of the Boards of Studies, with notices for meetings.
3. Preparation of comparative statement of Examiners.
4.
  - (i) Secretariate work in connection with the meetings of the Boards of Studies.
  - (ii) Drawing up of the Proceedings of the Board of Studies.
5.
  - (i) Appointment of Tabulators, Moderators and Examiners.
  - (ii) Printing of Forms of Appointment letters for Examiners.
  - (iii) Writing out of Appointment letters to Examiners, Tabulators and Moderators.
  - (iv) Issuing of Appointment letters to Examiners, Tabulators and Moderators.

*V. Work in connection with the supply of forms, etc., preliminary to Examinations.*

1. (i) Printing of application forms, Admission tickets (original and duplicate), blank answer-books, Logarithm tables, squared papers, Programme of Examinations, and Labels and Addresses for packets of question-papers.  
(ii) Issuing of application forms.
2. (i) Printing of letters to Superintendents, Rules for Examinations and Rules for the guidance of candidates.  
(ii) Issuing of letters, Rules, Log-tables, answer-books, squared papers, and programmes to Superintendents of centres.

*VI. Work in connection with cases of change of centres.*  
Correspondence.

*VII. Work in connection with the theses presented by candidates for Degree Examinations.*

- (i) Circulation of theses to Examiners.
- (ii) Communication of results to candidates.
- (iii) Publication of results in the Gazette.

*VIII. Work in connection with the receipts of application forms from candidates.*

1. (i) Receipt of applications.  
(ii) Scrutiny of applications.  
(iii) Assigning of Index numbers.
2. (i) Preparation of statements regarding question-papers required in each subject in each centre.  
(ii) Preparation of envelopes for sending out question-papers.
3. (i) Preparation of statements regarding the printing of Roll Cards.  
(ii) Printing of Roll Cards.  
(iii) Issuing of Roll Cards.
4. (i) Preparation of Rolls.  
(ii) Printing of Rolls.  
(iii) Issuing of Roll sheets to different centres.
5. (i) Writing out of Admission Tickets (original and duplicate).  
(ii) Despatch of Admission Tickets.  
(iii) Keeping of records of the despatch of Admission Tickets.

*IX. Arrangement work in connection with the holding of Examinations at Calcutta Centre.*

1. Correspondence on the subject of loan of examination halls.
2. (i) Preparation of statements regarding allotment of candidates to different centres.  
(ii) Printing of statements regarding allotment of candidates.  
(iii) Issuing of statements regarding allotment of candidates.
3. (i) Preparation of detailed plan of seats.  
(ii) Arrangement of furniture, etc.  
(iii) Assortment of Roll Cards.
4. Supervision work at the University Buildings Centres.
5. Carrying of question-papers to different Calcutta Centres.

## B. WORK DURING AND AFTER THE EXAMINATIONS

*I. Work in connection with the distribution of answer-papers.*

1. Preparation of statements of apportionment of answer-papers.
2. (i) Collection of answer-papers from different Centres.  
(ii) Despatch of answer-books to Examiners.  
(iii) Receipt of answer-papers from Examiners.  
(iv) Despatch of answer-papers to Head Examiners.
3. (i) Fixing of the latest dates for submission of marks.  
(ii) Printing of Notices regarding the latest dates for submission of marks.
4. (i) Apportionment of Slip Rolls for entering marks.  
(ii) Issuing of Slip Rolls, rules, question-papers and notices regarding last date for submission of marks to Examiners.

*II. Work in connection with Practical Examinations.*

1. (i) Fixing of dates of Practical Examinations.  
(ii) Printing of date sheets.  
(iii) Issuing of date sheets.
2. (i) Fixing of Centres for Practical Examinations.  
(ii) Printing of Notices for Practical Examinations.  
(iii) Issuing of Notices for Practical Examinations.
3. Returning Note-books submitted by candidates in connection with the Practical Examinations.

*III. Work in connection with the preliminary meetings of Examiners.*

1. (i) Preparation of Notices of meetings.  
(ii) Issuing of Notices of meetings.
2. (i) Printing or typing of Rules for marking determined by Examiners.  
(ii) Issuing of Rules for marking to individual Examiners.

*IV. Work in connection with receipt of marks.*

1. (i) Receipt of marks from Examiners.  
(ii) Issuing of marks to Tabulators.
2. (i) Preparation of re-examination slips.  
(ii) Sorting of answer-papers for purposes of re-examination.  
(iii) Issuing of re-examination slips and answer-papers to be re-examined.  
(iv) Receipt of re-examination marks.  
(v) Issuing of re-examination marks to Tabulators.

*V. Work in connection with the reporting of Examination results.*

1. (i) Preparation of Notices for meetings of Moderators and Examiners.  
(ii) Issuing of Notices of meetings.
2. Dealing with the reports of Superintendents of Examinations.
3. Preparation of the skeletons of the reports of Examiners.

*VI. Work in connection with the publication of results.*

1. (i) Checking of the Office copies of Rolls.  
      (ii) Drawing up of the lists of absentees.  
      (iii) Writing out of names of Institutions against names of candidates in the Rolls.
2. (i) Preparation of the lists of successful candidates (a) for sale, (b) for publication in the office, and (c) of publication in the Gazette.  
      (ii) Arrangement of the lists of successful candidates in alphabetical order as also in order of merit.  
      (iii) Checking of the lists of successful candidates.  
      (iv) Arrangements for publication of the lists of successful candidates in the Assam and Calcutta Gazettes.
3. (i) Preparation of errata.  
      (ii) Publication of errata in the Gazettes.

*VII. Work in connection with the results after their publication.*

1. (i) Printing of forms of mark-statements and crossed lists, and of certificates and Diplomas (original, duplicate and provisional), and of special certificates.  
      (ii) Writing and signing of the above.  
      (iii) Issuing of the above.  
      (iv) Keeping records of issuing.
2. (i) Preparation of crossed lists for different Institutions.  
      (ii) Issuing of crossed lists.  
      (iii) Keeping records of issuing.
3. Correspondence work regarding order of merit.
4. Drawing up of lists for the award of prizes, medals and scholarships.
5. Preparation of the lists of "Bad Schools."
6. Dealing with the reports of Examiners.

*VIII. Work in connection with scrutiny.*

1. (i) Collection of answer-papers examined.  
      (ii) Arrangement of answer-papers for purposes of scrutiny.
2. Drawing up of the lists of applicants for scrutiny.
3. (i) Preparation of covering letters to scrutinisers.  
      (ii) Issuing of covering letters with answer-papers to scrutinisers.  
      (iii) Receipts of Reports of scrutiny.  
      (iv) Communication of results of scrutiny.

*IX. Work in connection with statistical information.*

1. (i) Preparation of statements as required by the Education Departments of Government.  
      (ii) Issuing of statement.
2. Preparation of tabular statement.
3. Compilation of statements for the Annual Report of the Syndicate.

*X. Publication of Calendar.*

1. Printing of Examination papers in volume form.
  2. Printing of Class and Pass lists in volume form.
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# APPENDIX F

## RULES RELATING TO THE NEW M.B. EXAMINATIONS

I. The New Regulations will come into force with effect from June, 1940, subject to the provisions of the Transitory Regulations as outlined embodied in the Regulations as Chapter XLVI-A.

II. Chapter XLVI will come into force with effect from 1945 and will be applicable for the first time for those students who take their admission from June, 1940.

III. No student under the old M.B. Regulations once choosing to come under the new Regulations shall be allowed to revert to the old Regulations again.

IV. The Transitory Regulations will be applicable to the following classes of candidates :—

A. Those who will appear at the Preliminary Scientific, First, Second and Third M.B. Examinations in 1940 and are successful at such Examinations.

Such candidates will be given the option of continuing their studies (i) under the new Regulations or (ii) under the old Regulations.

B. Those who appear at the Preliminary, First, Second, Third and Final M.B. Examinations in 1940, but are unsuccessful.

Such candidates will also be given the option of proceeding (i) under, the new Regulations or (ii) under the old Regulations.

The Preliminary Scientific M.B., First M.B., Second M.B., Third M.B. and Final M.B. Examinations, under the old Regulations, will be held for the last time, respectively, in November, 1941, April, 1945, November, 1947, April, 1950, and November, 1952.

V. In order to facilitate holding of classes, theoretical and practical at the Medical colleges candidates who will appear under the old Regulations during the transitory period will attend the same number of lectures, theoretical and practical, as is prescribed under the new Regulations.

# APPENDIX G

## FURTHER CHANGES IN THE REGULATIONS (SANCTIONED BY GOVERNMENT SINCE THE PRINTING OFF OF THE MAIN BODY OF THE REGULATIONS)

### Chapter XXXVII

The paragraphs under head "Zoology and Comparative Anatomy" (p. 405 of the Regulations) have been *replaced* by the following :—

The scope of Zoology in each paper shall be as follows :—

#### *Theoretical*

##### *1st Paper—*

1st Half	.. History of Zoology; General principles of Biology, evidence and theories of evolution; Adaptation .. .. .	40
2nd Half	.. Origin and distribution of animals in space and time .. .. .	40

##### *2nd Paper—*

1st Half	.. Cytology and Genetics .. .. .	40
2nd Half	.. Histology and Embryology of vertebrates .. .. .	40

##### *3rd Paper—*

1st Half	.. The structure, bionomics, affinities, development and classification of invertebrates except Annelida, Arthropoda and Mollusca .. .. .	40
2nd Half	.. The structure, bionomics, affinities, development and classification of Annelida, Arthropoda and Mollusca .. .. .	40

##### *4th Paper—*

1st Half	.. The classification of Chordata; the structure, bionomics, affinities of Hemichordata, Urochordata, Cephalochordata and Cyclostomata .. .. .	40
2nd Half	.. Biology and comparative anatomy of vertebrates .. .. .	40

##### *5th Paper—* .. Special

Any of the following subjects, each distributed into two halves— 40+40

- (a) Entomology.
  - (b) Genetics and animal breeding.
  - (c) Fishery.
  - (d) Any other subject as may be determined by the Board of Higher Studies in Zoology from time to time.
- Each half paper shall be of two hours.

#### *Practical*

The Practical Examination shall carry 400 marks distributed as follows :—

1st day	.. Dissection and microscopic preparations of the invertebrata types .. .. .	75
2nd day	.. Dissection and microscopic preparations of the Chordata types .. .. .	75

3rd day	..	Identifications .. ..	60
		Examination of laboratory note-books and other sessional preparations submitted by the candidates .. ..	30
4th day	..	Microtom technique .. ..	60
5th day	..	Special :	
		(a) Dissection and identifications .. ..	60
		(b) Oral .. ..	20
		(c) Examination of laboratory and field note-books, collections and preparations submitted by the candidates .. ..	20

Candidates must produce note-books of their laboratory work, which must be duly certified by the teachers and shall be taken into account in estimating their qualifications.

The following new chapter (Chapter XXXVII-B) has been inserted in the Regulations :—

#### Chapter XXXVII-B\*

#### CERTIFICATE IN APPLIED PSYCHOLOGY

1. An examination for the Certificate in Applied Psychology shall be held annually in Calcutta in the month of June or at such time as may be fixed by the Syndicate.

2. A candidate who has passed one of the undermentioned examinations or has otherwise satisfied the Executive Committee of the Council of Post-Graduate Teaching in Arts that he possesses special qualifications for prosecuting the course, will be eligible for admission to the examination provided that he has prosecuted a regular course of study in Applied Psychology for one academic session in the Post-Graduate Department of the University :—

Master of Arts or Science in Psychology.

Bachelor of Arts or Science with Psychology as one of the subjects.

Bachelor of Teaching.

Bachelor of Medicine.

3. Every candidate shall send in his application with a Certificate in the form prescribed by the Board of Higher Studies in Psychology and a fee of Rupees Thirty (30) to the Registrar not less than six weeks before the date fixed for the commencement of the examination.

4. A candidate who fails to pass or to present himself for the examination shall not be entitled to claim a refund of the fee. A candidate who fails to pass or to appear at the examination may be admitted to any one or more subsequent examinations for the Certificate in Applied Psychology on payment of a like fee of Rupees Thirty (30) on each occasion, provided he produced a certificate from the Head of the Department showing that he has prosecuted a further course of study for a period of six months.

5. The examination shall be written, practical and oral and shall be conducted on the lines of syllabus to be drawn up from time to time by the Board of Higher Studies in Psychology and approved by the Executive Committee. The paper-setters and the examiners shall be appointed by the Executive Committee on the recommendation of the Board. The written examination shall consist of one special and two general papers of 100 marks each. Each paper shall be of 3 hours. There shall be a practical

\*Chapter XXXVII-A (Diploma in Inland Fisheries) is pending before Government for sanction.



examination consisting of one general paper and one special paper of 100 marks each. The laboratory note-books and the field records of the candidates shall carry 20 per cent. of the full marks in the practical paper. There shall also be an oral examination to test the general knowledge of the candidate in the subject, which shall carry 10 per cent. of the full marks in the practical papers.

6. In order to pass, the candidate must obtain at least 60 marks in the two general theoretical papers, 40 marks in the special paper and 80 marks in the practical examination and in the aggregate at least 50 per cent. of the total marks in the theoretical and the practical papers.

In order to be placed in the First Division candidates must obtain 66 per cent. of the total marks. The rest of the successful candidates will be placed in the Second Division.

7. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in two classes and in order of merit. Each successful candidate shall be given a certificate in the form prescribed in Appendix A.

8. The course of study shall be as follows :—

### *Theoretical*

<i>Paper I.</i> —General and Applied Psychology (including Mental Testing and Statistics) .. ..	100 marks
<i>Paper II.</i> —Social Psychology and Abnormal Psychology ..	100 „
<i>Paper III.</i> —Special Theoretical paper :—One of the following— .. ..	100 „
(a) Vocational and Industrial Psychology	
(b) Social Psychology	
(c) Education of Defectives and Mental Deficients.	

### *Practical*

<i>Paper IV.</i> —General .. ..	100 marks
<i>Paper V.</i> —Special .. ..	100 „

Candidates must produce their note-books for Practical and Field Works which must be duly certified by teachers and shall be taken into account and marked by Examiners.

and marked by Examiners.

			Lectures per week	Minimum Number of lectures
I. Theoretical—General Course of Study :—				
(i)	General and Applied Psychology	..	1	25
(ii)	Social Psychology	..	1	25
(iii)	Abnormal Psychology	..	1	25
(iv)	Mental Testing and Statistics	..	1	25
II. Theoretical—Social Course of Study :—				
Group A—Advanced Industrial Psychology		..	4	100
Group B—Advanced Social Psychology and Psychiatric Problems		..	4	100
Group C—Child Psychology and Mental Deficiency			4	100
			Hours per week	Minimum No. of hours
III.	Practical—General	..	2	50
IV.	Practical—Special	..	5	125
V.	Field Work—General	..	4	100
VI.	Field Work—Special	..	5	125

The following new chapter (Chapter XLIX-B) has been *inserted* after Chapter XLIX-A:—

### Chapter XLIX-B

#### DIPLOMA IN OBSTETRICS AND GYNÆCOLOGY

1. An examination for a Diploma in Obstetrics and Gynæcology shall be held in Calcutta twice annually at such time as the Syndicate shall determine, the approximate date to be notified in the Calendar.

2. Any Bachelor of Medicine, or Licentiate in Medicine and Surgery, may be admitted to this examination on production of certificates of having, subsequent to passing the M.B. or L.M.S. Examination (or an examination equivalent thereto) of a University in British India,—

(a) served as a House Surgeon for at least six months in an Obstetric and Gynæcological Hospital or in the Obstetric and Gynæcological Departments of a General Hospital recognised for this purpose, and subsequent to this,

(b) attended for a period of one year in a recognised institution a course of 40 lectures and 40 demonstrations in the following subjects:—

Practice of Midwifery  
Practice of Gynæcology  
Anatomy of Female Pelvis  
Elementary Embryology  
Pathology of Female Organs  
Ante-Natal Pathology

(c) and personally performed during this period not less than six obstetrical operations and conducted at least ten labour cases under the supervision of the medical staff of the recognised institution.

In case the requirement laid down in Section 2 (a) is not fulfilled, the candidate will have to attend lectures and demonstrations in a recognised institution for an additional period of six months in the subjects enumerated under Section 2(b).

3. Each candidate for admission to the examination shall send in his application to the Registrar, with a certificate in the form prescribed and a fee of Rs. 100, at least one month before the date fixed for the examination.

4. A candidate who fails to pass or present himself for the examination shall not be entitled to claim a refund of the fee. A candidate may be admitted to one or more subsequent examinations on payment of the prescribed fee on each occasion.

5. Every candidate shall be examined in the following subjects:—

- |  |           |
|--|-----------|
| (1) Obstetrics .. .. .                             | One Paper |
| (2) Gynæcology and Diseases of a New-born Child .. | One Paper |

A Clinical and Oral examination in Obstetrics and Gynæcology shall be held.

The examination is specially intended to test the student's knowledge of the Practical side of Obstetrics and Gynæcology.

6. The full marks for each subject shall be as follows:—

	Written	Oral	Clinical
Obstetrics	100	100	200
Gynæcology and Diseases of a New-born Child.	100	100	200

A candidate obtaining 50% of the marks in the Written and Oral portions combined and 50% in the Clinical portion shall be deemed to have passed the examination.

7. As soon as possible after the examination the Syndicate shall publish a list of successful candidates arranged in order of merit. Each successful candidate shall be given a Diploma in the form prescribed in Appendix A.





